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CONTENTS.

PAGE

Contents.

CONCERNING BRUGES (WITH ILLUSTRATIONS)..... 207
NOTES 209
THE STORY OF THE BRIDGE. III.—MEDIÆVAL (WITH ILLUSTRATIONS)..... 210
THE ARCHITECTURAL ASSOCIATION: FORTY-SECOND ANNUAL EXCURSION (WITH ILLUSTRATIONS) 212
GENERAL NEWS 215
BUNGALOW AT RADIPOLE, NEAR WEYMOUTH (WITH ILLUSTRATION)..... 216
COMPETITION NEWS 216
BOOKS 216
EDITORIAL SUMMARY..... 218
MAGAZINES AND REVIEWS 218
NOTES TO ILLUSTRATIONS 218
FIFTY YEARS AGO 218
CORRESPONDENCE 218

PAGE

MONTHLY REVIEW OF ENGINEERING:—
THE PENNSYLVANIA RAILWAY STATION, NEW YORK (WITH ILLUSTRATIONS) 219
BUILDINGS FOR EXPLOSIVES WORKS (WITH PLAN) 220
SOME STUDIES OF WELDS (WITH ILLUSTRATIONS) 221
NOTES (WITH ILLUSTRATIONS) 221

THE BUILDING TRADE:—
STUCCO 224
SOME LEGAL QUESTIONS ABOUT EXTRAS 224
GOVERNMENT CONTRACTS 225
GENERAL BUILDING NEWS..... 225
PROJECTED NEW BUILDINGS IN THE PROVINCES 226

SYLVESTER HOUSE, HACKNEY, N.E. (WITH ILLUSTRATIONS) 227
QUANTITY SURVEYORS IN SOUTH AFRICA..... 227
A NEW METAL FILAMENT LAMP..... 229

PAGE

LONDON COUNCILS 229
FOREIGN AND COLONIAL 229
LIST OF COMPETITIONS, CONTRACTS, ETC., OPEN ... 230
LAW REPORTS 232
PATENTS..... 232
SOME RECENT SALES..... 232
PRICES CURRENT..... 232
TENDERS 233

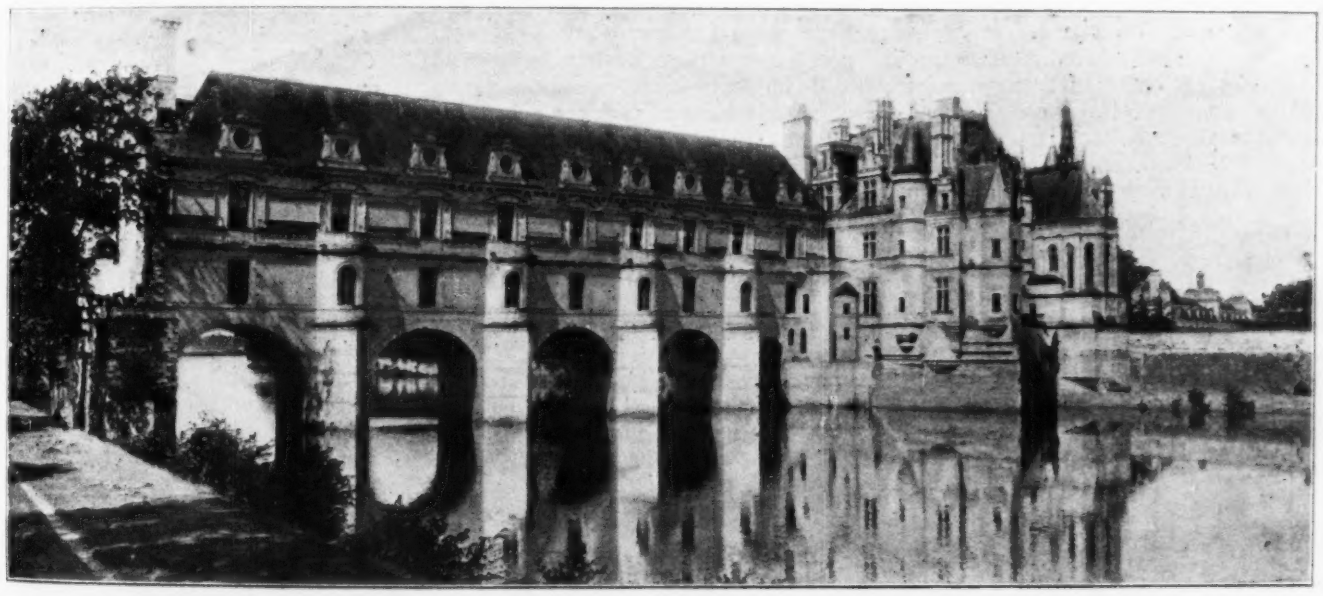
Illustrations.

PENNSYLVANIA RAILWAY STATION, NEW YORK: EXTERIOR. MESSRS. MCKIM, MEAD, & WHITE, ARCHITECTS.

DITTO: INTERIOR VIEWS.

PUENTE DE SAN JUAN DE LAS ABADESAS, GERONA.

PONT DES CONSULS OVER THE TARN, MONTAUBAN.



The Château of Chenonceaux. (A.A. Excursion. *See page* 212.)

CONCERNING BRUGES.

THE recent article in a contemporary* illustrating an artist's dwelling in Bruges is suggestive of considerations wider than its immediate subject. Attractive as are such private reserves, their charm, as the author justly remarks, is for the privileged few, while it is in any case confined to a narrow area. Such individual instances, however, naturally lead one on to a larger and more momentous question; none other, in fact, than that of the artistic fortunes and general conservation of a city which—like Venice, like Nuremberg—holds a special place in the international world of art and architecture, and is familiar in particular to English-speaking votaries. It is a question which in this day of change must awaken our most watchful interest.

Upon extending one's survey to the town at large in its various aspects, one is met by a strange conflict of conditions, to be left at last in a state of mind strongly tinctured with dismay. Not that Bruges has grown careless of her history and her charms—far from it, as will presently appear; but she affords in the twentieth century the unusual spectacle of a city bent, on the one hand, on renewing her mediæval youth, and, on the other, upon bringing herself into line with the latest commercialism. She is busied, in fact, in making the best of both worlds, the old and the new. The attempt is obviously hazardous: it irresistibly calls to mind the warning phrase *Ceci tuera cela*—where modern and mediæval dispute the field. Not, again, that her chief memorials of the past can ever be seriously endangered, but that that rarer and more elusive thing, her old-world atmosphere, the relative integrity of age yet remaining to her, may be suffered—half unconsciously perhaps—to evaporate.

A recent writer of a descriptive volume has been pleased, following a popular tradition, to entitle the same "Bruges la Morte." Were she indeed so in certain modernist aspects, it need surely give no ground for real regret. For it seems hardly fanciful to suggest that cities and countries, even as individuals, have a mission marked out for them by their character, circumstances, and traditions, a part to play in the world, a moral ideal to exhibit, with which even their material well-being is in a measure bound up. The vocation of Bruges would seem to be plainly declared by her past, and by its bequests through her to the present: to be the trustee of history and tradition, the witness to ancient art and ancient religion, the exemplar of modes of life and habits of thought which more modern communities cannot teach us—is not this a sufficing *rôle*, and are not such things, and nothing else, the lure that draws within her gates even yet the stranger from every strand?

Enough, however, of generalities: let us give specific proofs that regrets and anxieties are not groundless, at the same time allowing due weight to the more gratifying evidences which may meet us. Within the city the inroads of modernism are, so far, least noticeable. The street railway, indeed—an outrage unknown in industrial England—is an evil already of long standing, and now, it would seem, the electric tramway is to ply in

* See the *Connoisseur* for June.

thoroughfares which, up to the present, have scarcely peopled an omnibus. The widening, too, of the Rue Breidel at the heart of the town, the development of the plate-glass front in the larger streets, the stealthy removal of homely gables from the lesser ones and the like, are innovations serious enough. But it is on the fringe and in the approaches of the city—points that determine so largely its character, and give the traveller his first and last impressions—that the main mischief has been done. The prospect from the Minnewater Bridge is justly famed; yet even here one must be careful to look the one way, for on turning about one is confronted with extensive and unsightly ironworks built on the very brink of the canal, where till lately all was green and peaceful. At the other end of the city one cannot view the venerable gables of the Poterie without being *assommé* (the French word is apt) by a towering factory that dwarfs and vulgarises all its surroundings. The most widespread havoc, however, occurs on the neighbouring boundary of the town to the north, and is connected with the ship-canal scheme which would model Bruges on Manchester. Here a whole length of leafy rampart and curving moat have been remorselessly levelled and filled in and laid bare. Thereby the old Porte d'Ostende has been left half dry and wholly unscaled. It would be excellent work for the unemployed—if such there be in Bruges—to restore the ravished waterway. Meantime the site thus treated—*terra deserta et inria et inaquosa*—has been thrown into the new suburb rapidly springing up all about it, and those who deplore this wholesale transformation must get what comfort they can from the sounding and romantic titles fitted to its leading thoroughfares—*Boulevard Marie-de-Bourgogne*, *Toison-d'or*, and the rest. Mention of the ramparts reminds one that of a score and more of windmills that once studded their grassy mounds, but a single one was left. A companion mill overturned some time since by a storm has never been re-erected; the site waits, and the old fabric is understood to be available—another chance for the restorer. It must be allowed that the steel telephone towers which now—they were the latest acquisition—challenge the eye from point to point through the town make poor proxies for these relics of a day when even mechanism was picturesque! What may follow in the wake of the diversion of the railway system now pending and in progress one cannot pretend to foresee; one can only deplore the attempt at monumentalism already apparent in this connexion; from the æsthetic point of view the only thing to do with a railway is to keep it as quiet and inconspicuous as possible.

Now to glance briefly at the other side of the medal. Let it be acknowledged, fully and gratefully, that in the majority of new and renovated buildings local traditions of style have of late been followed, and with much success. The development illustrated by the "House of the Visitation" has been widespread. All praise is due to this remarkable revival of civil and domestic architecture, embracing in some cases the accessory arts and crafts. Many new and excellent frontages both great and small, of agreeable design and tonality, are due to this movement; while many old ones have been restored to warmth and colour by the simple removal of whitewash. There is no doubt a tendency to over-elaborate and over-vary, especially in public buildings, which too often lack the balance and repose displayed in their mediæval models, where symmetry was never lost sight of. This tendency is nowhere more evident than in the great official block on the Grand' Place—a pile due to an architect of ability now deceased, and at present receiving an interesting addition from another hand. In this case the splendid simplicity of the ancient *Waterhalle*, which formerly stood upon the site, might well have lent inspiration to the late designer.

One cannot speak of vanished monuments without recalling another danger. No town of antiquity is better *documenté* than Bruges. Numberless plans and views from the XVth century onwards show us, though necessarily to a small scale, not only buildings now respectably ancient, but even the predecessors of these. Hence a temptation to "restore" and reconstruct wholesale on *data* really insufficient, and to supplement them at need by conjecture. It would matter less were existing authentic work left untouched in the process. But, alas, this is not so! Certain alterations, indeed, have been excellently conceived—for instance, the restoration of the "Academy" building to its original proportions. On the other hand, we have in the west front of Notre-Dame a brand-new design, stiff and severe, for which the old façade, with its charming angle-turrets, has been ruthlessly sacrificed. That modernism should attack mediævalism is not surprising; but that antiquity should perish at the hands of its avowed admirers and imitators is grievous indeed. From the twofold danger thus confronting her, may Bruges—the Bruges of Memlinc and Van Eyck and David, of Blondeel, of Caxton, and so many memorable names and traditions—be in the hereafter preserved.

Those who dwell on the spot, to whom change comes piecemeal, are naturally less alive to it than those who revisit the city at intervals of time. But that many of the above considerations are realised by men of knowledge and standing within her own borders is made plain in the pages of the recent monumental work of the archæologist and historian, Canon Duclos: "Bruges: Histoire et Souvenirs." One welcomes the opportunity of offering from without some slight support to their position.

West Doorway, Notre-Dame, Bruges.

(From *L'Émulation*.)

RESEARCH HOSPITAL, CAMBRIDGE.

A research hospital is being erected in Cambridge for the Committee for the Study of Special Diseases, at a cost of some 2,000*l*. The plans, prepared by Mr. Herbert W. Maguire, provide accommodation for twenty patients in a building which will also serve as a private residence.

NOTES.

Hygiene of the Eye.

At a luncheon given recently by one of the leading electrical companies to representatives of the Press M. Leon Gastier, referring to what had been done as regards electric lighting, and what they sought to do, made use of a phrase which should find its place among those that throng, under modern conditions, round the architect of to-day. "Hygiene of the Eye" bespeaks an attitude of mind forced upon us by the very considerable perils which beset our most delicate organ to an increasing degree. It is still assumed in an entirely uncritical and undiscriminating way that the maximum of light in any circumstances is the object of human desire, and the condition of human welfare. The majority of modern dwellings on open sites are overlit even in the daytime, and at night the chilly glare of incandescent burners and the hard brilliance of the filament lamp in our public places and streets, in the taverns, and even in most of our homes, wring from the darkness the recuperative restfulness it was intended by Nature to supply. More brilliant and whiter light to an even more intolerable degree is still the aim of the manufacturers, and one must suppose, though it is doubtful really, the desire of the public. The necessary consideration of the hygiene of the eye will discover, however, in scientific ways what persons of taste and sensibility have always known. In our more pleasant apartments light from electric lamps is rendered as innocuous as may be by sheathing and shades of softly coloured silk, and candles are extensively in vogue. The student has learned to return to his oil lamp. We would not be surprised if a fair-minded consideration of illumination from the point of view of the scientist were to arrive at the conclusion that a light of this character is the ultimate desideratum.

London Water Supply.

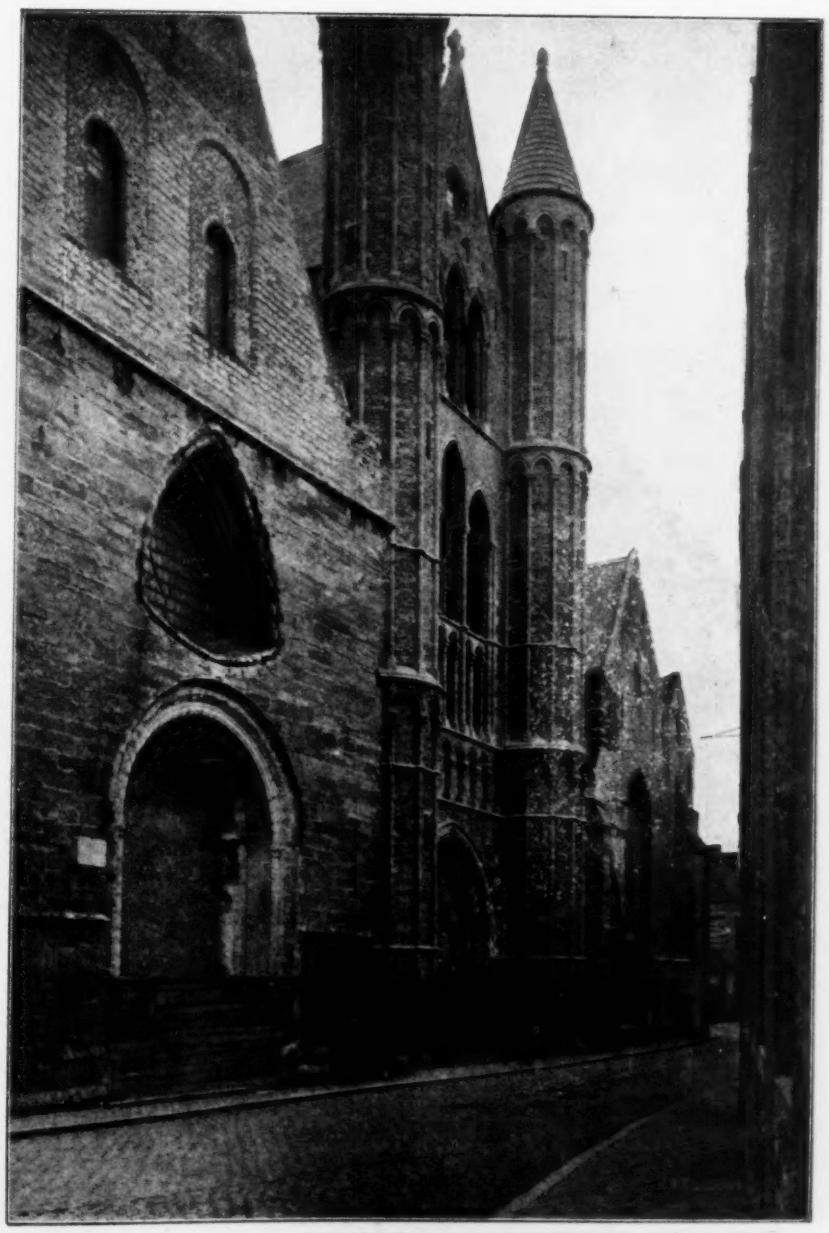
The annual reports of the Water Board and of Dr. Houston, their Water Examiner, form highly satisfactory reading. Without going to a far country for supplies or undertaking any specially heroic measures for the same purpose, London has an abundant quantity of pure and wholesome water, derived from a polluted and long-suffering river. The population of more than seven millions was supplied last year with 31·57 gallons per head daily, representing the aggregate volume of 82,170 million gallons for the period ending March 31. Dr. Houston's report confirms the conclusions previously stated as to the purifying effects of storage on a large scale. So effective is this process that it is practically impossible to detect the germs of water-borne disease in raw water which has been stored for a comparatively short time. As Dr. Houston says: "Storage is Nature's method of sterilisation without the addition of any sterilising agent to the water." Beyond this safeguard, now generally applied, thanks to the magnificent reservoirs of the Water Board, we have the further purification effected in sand filters, where 98 or 99 per cent. of the remaining organisms are removed. Comparing their abundant supply of pure water with the inadequate and somewhat questionable supplies available in Paris, Londoners have every reason for gratitude to the Metropolitan Water Board and to the old companies by whom were laid the foundations of the present incomparable system.

New Method of "Building."

There come—from the United States, of course—photographs of the erection of a church in four slabs. On the foundation wall and on piles inside the boundaries of the site a series of steel jacks is laid down. These jacks consist of a supporting carriage, a pivoted walking beam, and a collapsible screw driven by a worm gear and worm. A platform is laid on the jacks, and on this platform the design of the façade is laid out; all door-frames and window-openings are set in this position, and the concrete is packed round them. The whole wall is cast at once, allowed to dry, and slowly raised till it is perpendicular. The quoins are finished, the roof applied, and a "church," or anything else you will so long as it be formed of plane surfaces, is the result. This is undoubtedly practicable, and a legitimate extension of the collapsible summer-house, itself derived from the packing-case, all being logical and simple methods of enclosing cubic space. However, be the design as perfectly proportioned and harmonious as it may, let no one imagine that architecture is involved.

Strikes and Electric Lighting.

The strike of workmen at the Liverpool power station draws attention to the need of amending the Conspiracy and Protection of Property Act, 1875, to bring it into line with modern requirements. Sect. 4 of that Act contains special provisions relating to employees of a municipal authority or of any company or contractor upon which is imposed by Act of Parliament the duty of supplying any city, borough, town, or place with gas or water who wilfully or maliciously break contracts of service knowing or having reasonable cause to believe that the probable consequences of such breach will be to deprive the inhabitants wholly or to a great extent of their supply of gas or water. Electric light has in many towns and districts superseded gas, and the reasoning which made special provisions desirable in regard to employees employed in supplying gas under statutory powers applies



West Front, Notre-Dame, Bruges.
(From *L'Émulation*.)

with equal force to employees engaged in supplying electric light under similar conditions, yet we are not aware of any statute which extends the provisions of sect. 4 of the Conspiracy and Protection of Property Act to workmen engaged in the supply of this modern necessity of life—electric light. Possibly the section could usefully be extended to other statutory undertakings as well where public interests are concerned.

A Lesson of the Strike.

WHILE congratulating ourselves upon the cessation of the railway strike it is impossible to escape one disquieting reflection. Mr. Lloyd George's scheme of 1907, which was generously acclaimed by all parties, and accepted by both masters and men, should have rendered this national strike impossible. Unfortunately, it seems to have shared the fate of many an international treaty. The last chapter in the history of such an instrument too often records its destruction at the hands of one of the signatories who had become dissatisfied with its working. It would appear that in these industrial conflicts the most perfect scheme of settlement—should it fail to turn out as advantageous in its effect as had been anticipated when it was drawn up—cannot be relied on for a lasting peace. Signed agreements may be ignored or repudiated, and an ancient warning slightly paraphrased aptly applies to this modern situation—"Put not your trust in treaties nor in any scheme of man's." Our readers will notice that they are touched most closely by the closing paragraph of the Instructions to the Special Commission of Inquiry which has been formed—"The Government have promised the railway companies legislation providing that an increase in the cost of labour due to the improvement of conditions for the staff would be a valid justification for a reasonable general increase of charges within the legal maxima, if challenged." Reading between the lines the manufacturer and trader will be prepared to find a share of the burden laid upon their shoulders—as usual.

THE STORY OF THE BRIDGE.

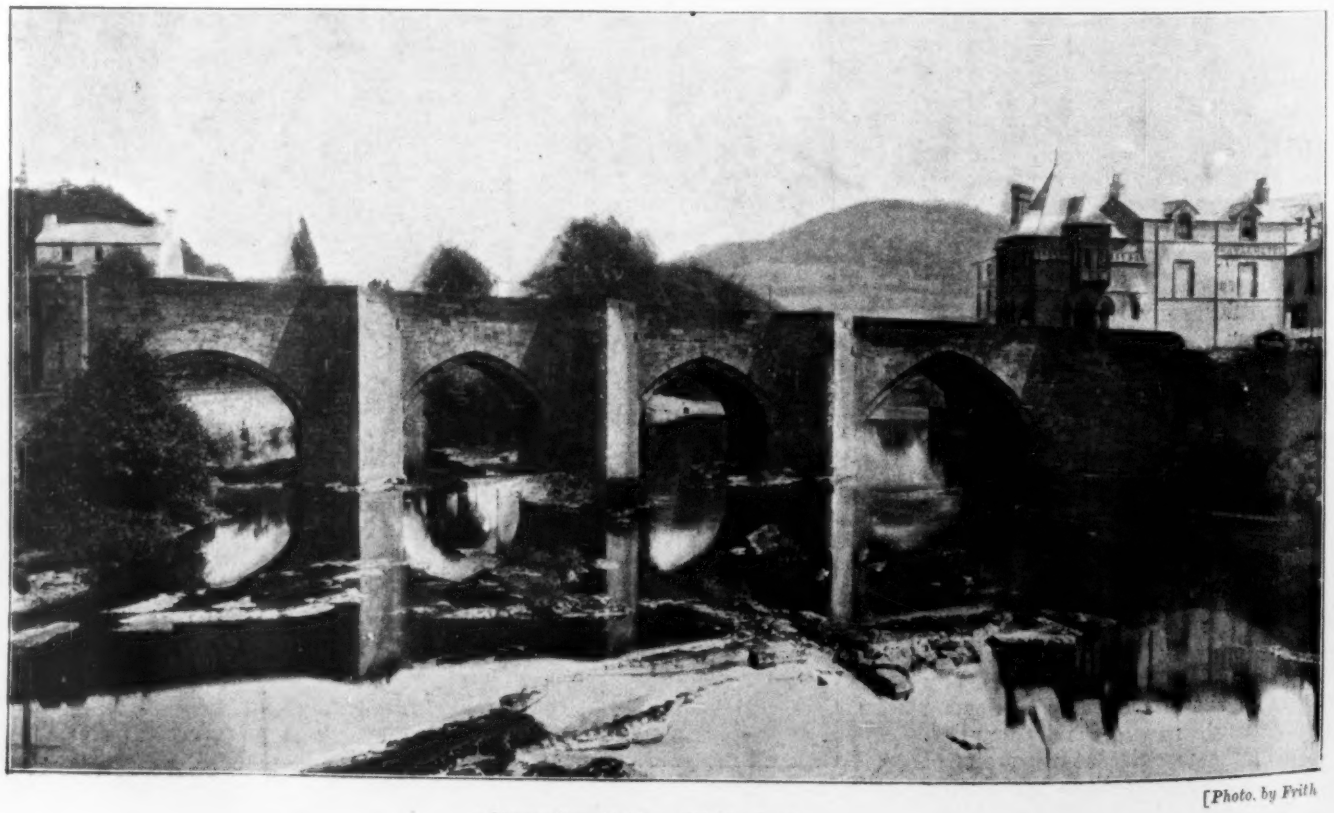
By WALTER SHAW SPARROW.

III.—MEDIÆVAL.

TO ENCOURAGE the making or the upkeep of bridges was counted as an act of piety in mediæval days, "a blessid besines," a charitable duty, essential to the safety of pilgrims and wayfarers; so bishops and abbots, to bring this matter home to lay minds, granted remissions of penance to those (and they were many) who forgot that the King's highways had to be kept in order by every landlord who owned property in their neighbourhood. This, in theory, was part of the *trinoda necessitas*, but landlords often shifted the obligation from themselves to their tenants, who kept their conscience quiet by having no dislike for a bad memory. Then the law became busy, trying to fix blame on the right persons; and as the law, then as now, halted for many "refreshers"—greedy thing!—the church, more active by far, gave practical help, granting "forty days indulgence to all who would draw from the treasure that God had given them valuable and charitable aid towards the building and repair" of some poor bridge or other. But there was no fun in this; the fun began when justice, having come to a definite decision, told the bailiff or the sheriff to be aggressive in right directions. If landlords or their tenants declined to pay what they owed to the bridge, then some of their property was seized—a horse, a cow, a flock of geese, something saleable, in fact; as in the case of Hamo de Morston, of Old Shoreham, in Sussex, who in the eleventh year of Edward II. made a great outcry because a bailiff, good Simon Porter, had not only taken a horse from him but sold it for the benefit of the venerable timber bridge. Hamo appealed against this act, but without success. A little historic immortality he did gain, but nothing useful to himself.

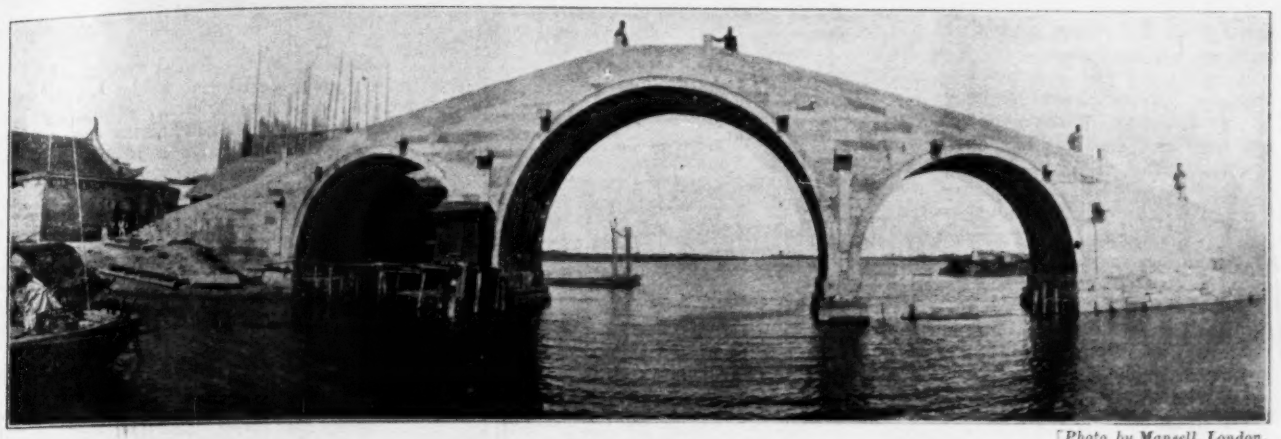
And I am glad—very. It was men of his type who in the Middle Ages disfigured the architectural history that bridges ought to have handed on unharmed from generation to generation. They were not so bad as the industrial spirit which during the last century has played havoc everywhere, destroying ancient bridges as if they were evil things; but whether the Hamo de Morston belongs to this age or to another, he is always a pretentious fool. Think of the interest which Old London Bridge would excite to-day if it had been kept as a great historic monument. When Samuel Scott painted it in 1745 it was still a romantic street, with houses and shops; and at the time of its final destruction, in the year 1831, when New London Bridge was opened to circulation (after costing 1,458,311*l.*, by the way), its value as a show-place was a legacy from the long ago which ought to have been delivered down, properly renewed, to our shillings and sixpences. But modern trade has ravaging ambitions, and criticism has no more effect upon it than bullets have on a target. We must consider ourselves fortunate that although in England there is not even one old bridge equal in importance to many on the Continent, yet we do find good examples of mediæval bridge-building, particularly in districts where there has been but little increase of traffic. We possess bridges with defensive towers and bridges with chapels, as I shall show in my next paper; and some good specimens exist of bridges with triangular recesses built out from the parapet and forming a part of the piers. These were designed not only as shelter-places for wayfarers, but also because they lessened the cost of bridge-building, inasmuch as they gave width and convenience to a narrow roadway, so that their value in this work is very similar to that which bay-windows have long had in the planning of rooms.

By way of example I give the famous Llangollen Bridge, with its four unequal arches, and its look of bluff vigour in old age. It comes down to us—a little widened, thirty-three years ago—from John Trevor, Bishop of St. Asaph, who died in 1357, and whose workmen did not care a rap for uniformity of design. What they liked was a secure foundation for each of their piers, and it saved time and expense to sound the river-bed and to build from the flattest places in slippery rock. The widest arch would have



[*Photo. by Frith*

Llangollen Bridge, XIVth Century.



[Photo. by Mansell, London.

Chinese Bridge.

a span of 28 ft., and the two smallest ones would occupy the central position. But the main point, after all, was to do such work as would withstand the fury of a gathering flood. In this one matter the craftsmanship was a complete success. But there is no ambition, no imagination, in the design of Llangollen Bridge. It conquers the dangerous waters, but in a stubborn, dull fashion. It has the look of Hodge in armour, heavy and dogged, dauntless and lumbering. And this applies to many a British bridge having a long history. The one over the Nith at Dumfries, which was long considered the finest after Old London Bridge, is a damaged exception, dating from the XIIIth century. Formerly it had thirteen arches—an unlucky number, perhaps, for only seven are now in use. There used to be real aspiration in the design, a certain high triumph over difficulties and perils, and for the remains of this quality we have reason to be grateful.

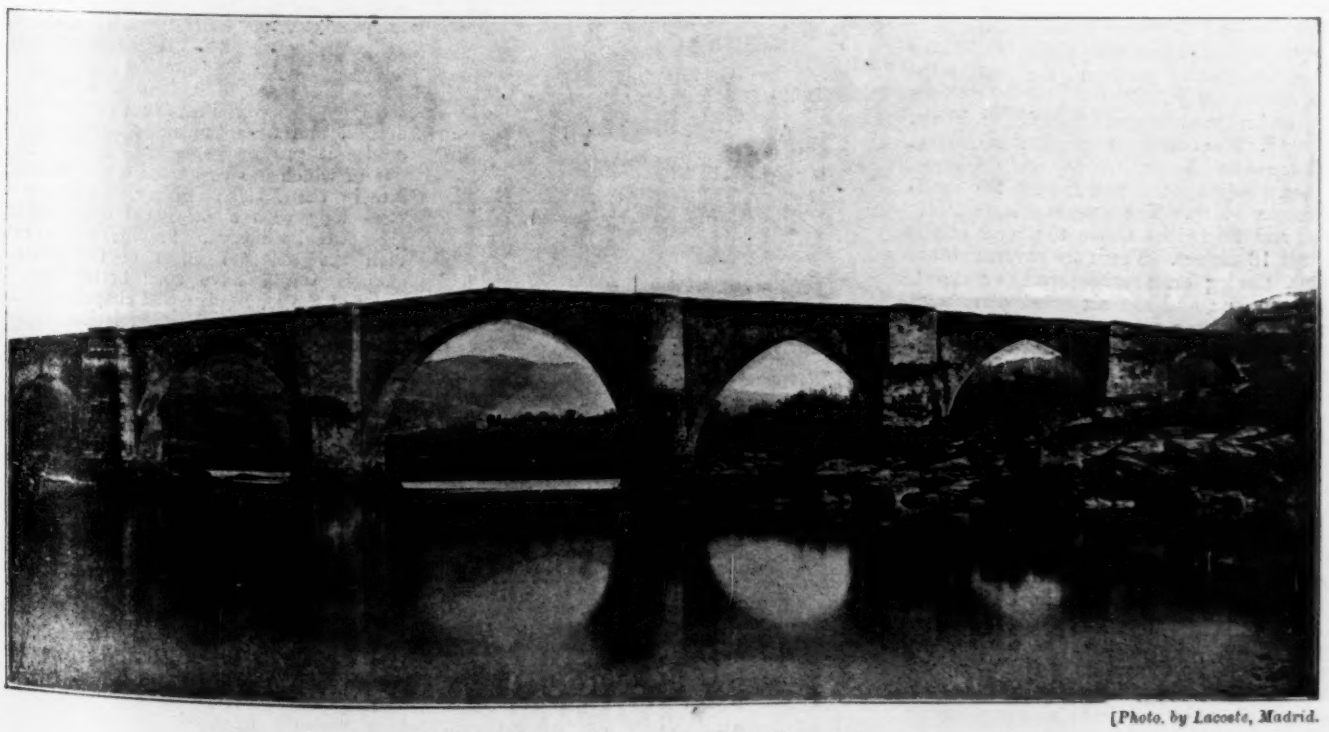
Old England used to speak with delight about a certain beauty described as "faerie," a certain grace that aspired with an air of heroic life, as if it came into the common world from that enchanted time when King Arthur ruled. It is just this faerie magic that old English bridges lack. They are good pedestrian prose, often enough, but the great poetry of Gothic art, its easy triumph in upward flight, is absent as a rule. Here and there we come upon a half-exception, like the ever-famous Twisel Bridge, Northumberland, which has changed but little since Lord Surrey threw his army across it to reach Flodden Field, turning the flank of the Scotch hosts.

It is a graceful piece of architecture, alert and wideawake; it has one strong arch, with a touch of the XIIIth century in its semicircular span, which measures 90 ft. 7 in. from abutment to abutment. The parapet from its centre shelves downwards at each side, its greatest height from the waters of the Till being 46 ft. 2 in. I note, too, that the arch is groined and ribbed, quite a common trait in mediæval bridge-building, above all, in Poitou and in England. Viollet-le-Duc mentions this kind of arch, and says that the groins, separated from the bed of the road by a space filled with loose flagging, were *posés en rainure dans les piles en conservant une parfaite élasticité*. All rain-water that found its way through the road passed with ease between the joints of the flagging, without leaving a deposit of saltpetre on the haunches of the arch; and, as the work was lighter than in other arches, there was less pressure on the piers. Moreover, this system of arch-building, which dates from the end of the XIIth century, or from the beginning of the XIIIth, was more economical than any other, employing one-third less of keyed materials. The spandrels above these groined arches were of ashlar, and it was easy to repair them without interrupting traffic.

Another distinguishing characteristic of mediæval bridges is what the French call the *dos d'âne*, the shelving parapet and roadway on either side from a point just above the keystone of the central arch. It is often supposed that this trait is European, yet it is found also in Chinese bridges, which are very graceful at their best, pure and strong in design, and having fine arches in which the semicircle is prolonged without forming a true horseshoe. I have chosen a Chinese bridge as an illustration, and set it side by side with two Spanish examples, the Puente de San Juan de las Abadesas at Gerona, and the Puente Mayor over the Miño at Orense, Galicia, which, to my mind, is the most stately of all shelving bridges. The Moors left in Spain a peculiar grace of style which native architects often united to their own qualities, a haughty distinction and a lofty ambition. Consider the immense nave in the Gerona Cathedral, a glorious pointed vault measuring not less than 73 ft. from side to side, almost double the width of Westminster nave. It belongs to the XVth century, yet in the magic of its youthful hope it proves that its architect, Gullielmo Boffiy, was a child of the XIIIth. And the great central arch of the Gerona bridge has in it some of the soaring courage that transcends all expectation in the cathedral nave.

This bridge, with its look of battered antiquity, is certainly very fine, but less majestic than the masterpiece at Orense, a stone bridge of the XIIIth century, with seven elastic arches, all alertly dignified, and with a total length of more than 1,300 ft. The great central arch is 156 ft. wide between the piers, and its keystone is 135 ft. above the river-bed. "The Miño rises rapidly and to a great height," says Walter Wood, in "A Corner of Spain"; "and it was with the object of safeguarding the bridge against the sudden inundations that the arch was made so high."

True: and this brings us to the origin of those bridges that shelve down at each side from a point in the centre of their parapets and footways. Two useful purposes were served by making the central arch wider



[Photo. by Lacoste, Madrid.

The Puente Mayor over the Miño, Orense.

and higher than the others, since there was greater space for navigation as well as for waters in flood; but when a bridge had only one arch its up-and-down roadway was usually inconvenient, because the incline was not long and gradual, but short and steep. Take the Pont-y-Prydd, near Cardiff, built in the XVIIIth century, and having a pathway so abrupt in its slope that laths of wood used to be stretched across it as a foothold for horses. In frosty weather a shelving bridge was often a breakneck place; and there is evidence that architects at an early date told each other that their departure from the Roman tradition of level bridges was undignified. It was a tradition not without exceptions, since the *dos d'âne* was used at times by Roman bridge-builders; but a level causeway was more typical of Roman craftsmanship, and it influenced mediæval architects and engineers. Among my illustrations is a good example, Le Pont des Consuls over the Tarn at Montauban.

Here is a noble monument of the XIVth century, and its history brings before us a good many of the hindrances to bridge-building that held sway over craftsmen in the Middle Ages. Whenever a bridge would connect the lands of rival lords or of jealous provinces or counties, its construction was resented and opposed; when built, determined efforts were often made by one party to hold it against the other; and sometimes a great fortress was put up at each end, commanding the entry. Though the village of Montauban was founded in 1144, by Alphonse Jourdain, Comte de Toulouse, and though the founder ordered that a bridge should be made at once and kept in proper repair by the inhabitants, yet nothing was done for many generations. Sometimes poverty was pleaded as an excuse, and sometimes the Albigeois wars; delays breed excuses invariably. But at last, in 1264, the good men of Montauban become active, and in 1291 they bought the island of Castillons or of Pissotte to serve as a foundation for some of the piers; but even then their efforts would have given way but for Philippe le Bel, who asserted his authority as King, appointing two consuls as overseers, and commanding that a tax was to be levied on all visitors to Montauban as a means of raising funds for the bridge-building. Three strong towers were to be built on the bridge, one at each end, the other in the middle; and these towers were to be guarded for the King by Royal troops. These commands were given in 1304, when Mathieu de Verdun and Étienne de Ferrières were consuls. Yet nothing much was done. The bridge seemed to creep into existence, for it was not finished till 1335. Still, the design was boldly good and the craftsmanship was excellent.

It is a bridge entirely of brick, 250 m. 50 cm. in length. The bricks are excellent in quality, and measure 5 centimetres in thickness, 40 centimetres in length, and 28 centimetres in width. The roadway is perfectly level, and its height above the level of the Tarn is 18 metres. There are seven pointed arches, having an average span, or chord, of 22 metres; and the six great piers with beaked buttresses are 8 m. 55 cm. in thickness, and note how they are pierced with high arched bays to facilitate the passage of water during floods. The defensive towers have gone, but the strongest one of all was built at the end facing the town. It was square in shape, and its summit was a platform with crenelles and machicolations. The other end tower was a weaker version of this one, while the central defence, built over the middle buttress on the side looking down the river, was triangular, and there was room enough in it for a chapel. A flight of winding steps went down to a postern pierced through the buttress at the water's level; and at the other side of the pier, just below the arched bay, hung a sort of see-saw that carried an iron cage in which blasphemers were put to be ducked in the river.

FORTY-SECOND ANNUAL EXCURSION: TOURAINE.

In 1905, the last occasion on which the A.A. Excursion visited France, the headquarters were at Lisieux, and by the selection of old Touraine as the district for this year's excursion a very different objective was ensured. Around Lisieux the country is rich in brick and half-timber cottages and small manors, while Touraine shows an unequalled series of mediæval and Early Renaissance stone châteaux and mansions. The district is one rich not only in architectural remains, but in historical associations, and has an added interest for Englishmen as having formed part of the dominions of our Angevin kings, whose hearts, indeed, were generally here, where with plot and counterplot they sought to secure and extend

BLOIS

their French dominions. The country is to this day an enduring testimony to the character of the feudal system, under which the great territorial nobles waged continual war with one another, combining and recombining with bewildering changefulness in the great game. In a later epoch most of the feudal castles became hunting boxes, but the nobles remained. Up to the time of Francis I., under whom the Court often migrated to Paris (where under later kings it finally settled), Touraine had been the centre of political France, if a centre it could be said to have. The Court for centuries had moved to and fro among the pleasant châteaux in the valley of the Loire.

Between Blois and Saumur, a distance of about eighty miles, the Loire receives from the south four tributaries, the Cosson, the Cher, the Indre, and the Vienne, and the country so watered was covered until the end of the XVIth century with a multitude of châteaux, not only the frowning towers of feudalism, but the more gracious and elegant abodes raised by the nobles of later days. The wars of religion and of the Fronde accounted for some of them, the great Revolution destroyed more, but still a great number remain, a tribute to their excellent solidity and to the enduring qualities of the fine building stone with which they are constructed.

Whether consciously or not, the Hon. Secretaries in arranging the excursion laid down a programme almost exactly similar to that of John Evelyn, who visited the Loire Valley in 1644. He also stayed for a few days at Blois, passing on from thence to Tours, "where," he says, "we were design'd for the rest of the time I had resolv'd to stay in France, the sojournment being so agreeable." His method of progression, however, though less expeditious, was the more picturesque, for "he tooke boate on the Loir," where we in later days took train or motor to reach the various châteaux on the banks of the river and its tributaries.

The party arrived at Blois on the morning of Saturday, August 12, having travelled all night. This arrangement, though much to be preferred owing to the great heat, necessarily prevented a very active spirit on the first day, and the time was spent in a leisurely exploration of the town. Besides the château it contains much interesting work. The fine abbey church of St. Nicholas attracted, perhaps, most attention. Built by the Benedictines between 1135 and 1210, it has all the refreshing freedom of early pointed work, before planning and design had fallen too much into orthodox lines, and has suffered little from restoration. The choir, transept, and easternmost bay of the nave are the earliest work, and show very beautiful Byzantine carving and other curious Romanesque details. Very interesting is the plan of the east end. The choir is two bays long beyond the central tower, with double aisles on either side, the outermost forming naves to the chapels opening out of the transept. The apse is divided in seven narrow bays by cylindrical shafts carrying pointed arches, and from the ambulatory which encircles it project three chapels, the central one of which has been rebuilt and lengthened late in the XIIIth century. It is now two bays long with a polygonal apse and large geometrical windows. Previous to this extension the external effect of the clustering chapels would have been better seen, the apses of the long transeptal chapels and those of the chevet coming into relation with one another. The low central tower contains an interesting lantern in the form of a ribbed dome springing from a circular arcade on pendentives, which may be derivatives from Fontevrault. The nave, slightly later in date, with plate tracery in the clearstory, is of five bays, the westernmost, between the twin towers, having a low-vaulted gallery, inserted in the XVIIIth century, carrying the organ. All the church is stone vaulted. The west front is striking and well seen from a little *place*. Its twin towers are aggressively unequal in spacing, but recover their effect of relation in their belfry stages, each consisting there of an open double arch on each face without louvres. All three towers are surmounted by slated spires of not very convincing form. The western portals have been severely damaged, but are fortunately unrestored. The cathedral of St. Louis, finely

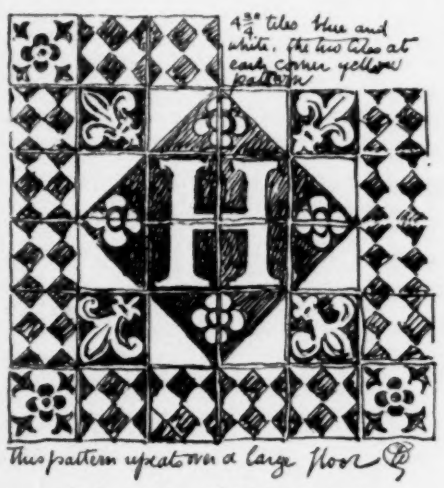
placed on an eminence eastward of the town, is interesting chiefly on account of its curious character, being a pseudo-flamboyant rebuilding by J. H. Mansart dating from 1678. The work at once suggests comparison with Wren's Gothic churches, and, like them, is not without merit as abstract design, though deficient in the true organic properties of genuine mediæval work. A great deal of the interior detail has never been completed. The plan is a simple nave with aisles and apsidal termination at the east. A fanciful Renaissance tower, dating from 1544 and 1609, stands at the north-west corner. The two other churches of Blois, St. Saturnin and St. Vincent, are inferior in architectural importance to St. Nicholas and the cathedral, but are yet not without considerable interest. St. Saturnin is situated across the Loire in the Faubourg de Vienne, and is in a fragmentary condition, showing the unfinished commencement of a flamboyant west front of commanding scale, but little else that is coherent externally. Internally the low nave affords a striking surprise after the promise of the west front. This is in the hybrid style of the XVIth century, and appears to represent a concession to the funds disposable, which were constantly ignored at the inception of building schemes in the great periods of France. Opposite the church is an interesting mediæval building. The other church, St. Vincent, is the old church of the Jesuits—a work of the Baroque, clumsy and artificial.

Some of the lesser buildings of Blois attracted considerable attention from sketchers, but little could be learnt of their past history, except details obviously apocryphal. The street views generally have all the charm which arises from great difference in level skilfully treated. There is a great quantity of the very simplest Renaissance work, devoid of "features," but making in the mass most satisfactory street architecture. The mediæval timber houses in the ancient back streets also repaid exploration.

Mr. Ward, in his book on Du Cerceau, says, "The château of Blois, one of the most splendid in France, is of very various periods, and has the unique merit of exhibiting first-rate examples of three periods of the Renaissance, besides earlier work. The Louis XII. wing is a charming example of the hybrid transitional phase; the Francis I. wing and its elaborate open stair illustrates the exuberant fancy and delicate decoration of which the Early Valois phase is capable, while the buildings of Gaston of Orleans in their sober majesty are among the most stately creations of the XVIIth century."

The architectural history of the present château practically dates from the return of Charles of Orleans from England, where he had been held prisoner since the battle of Agincourt. The site had, however, been fortified from Roman times, and of the mediæval castle the great hall remains at the north-east angle, and the Tour des Oubliettes at the north west angle, the latter masked by the additions of Francis I., which also enclose the curtain wall connecting these two fragments of the earlier buildings. Charles converted the fortress to a pleasure house, but most of his extensive buildings have been either destroyed, to make way for the wing built by François Mansart for Gaston of Orleans, or had been previously refaced under Francis I. His son, Louis XII., built the wing forming the eastern side of the court, which yet remains, and possibly also the chapel (on old foundations), together with a spacious ante-chapel since destroyed. Under Francis I. the courtyard front of the north wing was refaced, and the celebrated stair-tower built, while a new suite of apartments was added running along the outer face of this wing, and projecting outside the curtain wall, where it opened on to a terrace. The galleried front on this side arose somewhat curiously, step by step. First a one-storied loggia was built on the terrace; on this a wooden gallery (soon replaced by a stone one) was added; finally, the third gallery was formed by placing a row of columns on the parapet and carrying the roof out to them. Various minor additions were made by succeeding kings, but Gaston, brother of Louis XIII., on retiring to Blois, determined to rebuild the castle in the manner of the age. A design for a palace of great magnificence was prepared by François Mansart, but only a portion was executed. This was destined to be the back of the inner court, and was begun in 1635. Lack of funds prevented its completion, and if we regret the loss of what promised to be a very splendid building we are consoled by the retention of the earlier work, which must have been destroyed to give it place. After 1660 Blois ceased to be a royal residence, and fell into decay; it was further damaged at the time of the Great Revolution, but has been restored since 1845 by M. Jacques Duban.

The entrance is from the Place du Château by an arched doorway surmounted by an equestrian statue of Louis XII., and showing his badge, the porcupine. This front has been recently further restored, and its once beautiful brickwork, diapered with black bricks, now presents an appearance of absolute newness. On the ground floor to the left of the entrance is the Salle des Gardes, entirely restored, but containing a fine collection of the medals and reliefs of Daniel Depuis. At the chapel restoration is yet in progress—it is very "thorough." Crossing the courtyard to the Mansart buildings, it was observed that a considerable amount of the moulded and carved detail has never been executed, and on entering the magnificent staircase hall further similar evidence of the gradual cessation of work was apparent; once again ambition had overshot the means to fulfilment. Ascending by the François Premiere escalier, it was at once apparent that no illustration or description is capable of adequately portraying the delicacy of design of this building, which exhibits a fluency of



Floor Tiling: Château de Blois.

idea and execution marking it out as the work of a genius. It is, however, essentially mediæval in motive, and one's sole regret is that its detail was not worked out while Gothic freedom remained absolute. The beautiful reflex curve by which the steps join the central newel is a particularly happy device. On the first floor of the Francis I. building are the apartments of Catherine de Médicis, rendered rather repulsive by gaudy restored decorations. Her cabinet de travail has, however, fine panelling, comprising over 200 small panels, each carved with a varied design in low relief. The floor above contains the apartments of Henri III., in which the well-known circumstances of the murder of the Duc de Guise took place. These upper floors have dull-glazed tile flooring of considerable beauty of design and colour, laid on the timber construction in the manner locally common. The colours employed are chiefly blue, yellow, greyish-white, and dull brown, mostly arranged in simple patterns with checker ornament and borders; a specially fine example in the apartments of Henri III. has at intervals tiles bearing the Royal initial. Descending by a staircase, the great hall of the mediæval castle, used later as the Salle des Etats, was reached—a spacious, lofty hall divided lengthwise into two spans by a row of columns, but ruined by gaudy colour. With the exception of the Mansart wing, all the interiors suffer from this cause, and are much inferior in interest to the façades.

No official programme had been prepared for Sunday, but the majority of the party drove to an interesting small château at Villesavin—a low, wide-spreading building, with steep-pitched roofs and dormers, said to have been procured from Chambord, where presumably the quantity surveyor or his equivalent had made too liberal an allowance in number.

First Day—Monday.

Monday's programme included a visit to Château du Moulin, followed by Chambord, but transport difficulties consequent on the exceptionally hot weather entailed some re-arrangement, only a small proportion of the members venturing on the drive to Chambord, and joining the remainder of the party *en route* for du Moulin, whence they proceeded by train from Blois.

At Chambord we see a royal castle of Francis I., unfettered by the incorporation of earlier buildings, and erected as a complete work on a site chosen by the King. The style may therefore stand or fall on its merits, and we incline to agree with Mr. Ward that "the combination of a riotous profusion of delicately-ornamented features, each individually beautiful, with the rather clumsy general proportions fails to produce a wholly pleasing effect." The building was commenced in 1520, and, after a period of interruption due to the Italian war and Francis's consequent captivity in Spain, was energetically pushed on, so that the "keep" was complete in 1539 and the north-west wing and tower between 1540 and 1550. The design is now attributed to Dominic of Cortona, known as Boccadoro, who was at Blois until 1531 engaged on the work there, but the general lay-out of the plan shows it to be a direct descendant of the mediæval castle, and most authorities ascribe the authorship to Pierre Nepveu, called Trinqueau, who was apparently in charge of the works, either as master mason or architect. A model made by Boccadoro was still existing in the XVIIth century. The complete scheme consisted of a square keep or donjon, with four circular corner towers, standing on the north side of a court, and united by lofty galleries from the two northern towers to the ranges of buildings forming the eastern, western, and southern sides of the court. These were one story only in height throughout the south front and the adjoining portions to the east and west. At either angle of the court was another lofty circular tower generally similar to those forming part of the donjon; the southern pair, however, were never raised above the level of the adjoining buildings, which were roofed by balustraded terraces. The terrace and moat outside the castle walls were also not completed, though shown in du Cerceau's drawings. The internal planning of the donjon is most remarkable, being severed in four by a cross-planned hall, the centre of which is occupied by a double spiral staircase, surmounted above the roof by an elegant open lantern. Originally, this hall was open up to the roof, which is a semi-elliptic panelled barrel vault in stone, but intermediate floors have been inserted. John Evelyn was here in 1644, and unaccountably seems to have been disappointed. In his diary, he says, "I was particularly desirous of seeing this palace, from the extravagance of the designe, especially the stayre-case mentioned by Palladio. It is said that 1,800 workmen were constantly employ'd in this fabric for twelve yeares; if so, it is wonderfull that it was not finish'd, it being no greater than divers gentlemen's houses in England, both for roome or circuit. The carvings are very rich and full. The stayre-case is devised with four entries or ascents, which cross one another, so that tho' four persons meete they never come in sight, but by small loopeholes, till they land. It consists of 274 stepps (as I remember), and is an extraordinary worke, but of far greater expense than use or beauty. The chimnys of the house appeare like so many towres." The cold English common sense of Evelyn was, in fact, incapable of appreciating so altogether abnormal a design as Chambord, which cannot be judged by common standards—it is obviously a *tour de force*. In addition to the extravagance of the general idea, the detail throughout shows an extraordinary wealth of invention, and is constantly varied, only the general mass of answering features balancing. Some curious expedients are employed, notably the formation of roundels and lozenges by cut slate nailed in position

on the stonework. The columns round the drum of the fantastic central lantern display entasis in a particularly obnoxious form, and there are numerous other lapses in detail. The château is, nevertheless, a building on no account to be missed, and well repaid the trouble of visiting under rather trying conditions.

A long drive in a south-easterly direction from Blois is ordinarily the means of reaching the Château du Moulin, but owing to the tropical weather no cocher would undertake the task. The train had therefore to be taken as far as Romorantin, and the château reached from thence by road. The house is a beautiful and complete specimen of very early Renaissance manor, built in 1480 by Pierre du Moulin. The design is said to be due to Jacques de Persigny, and includes a number of the inevitable round towers with their extinguisher roofs and an encircling moat with drawbridge. The construction, like most of the latest mediæval domestic work, is of brick and stone. The house is approached on the north side through a gateway tower flanked by lofty turrets pierced only with oillets. The wing westward of the entrance is incomplete, but that to the eastward, uniting the gatehouse to a circular corner tower, shows the intended form. The house proper stands entirely within the square formed by the curtain wall, and is a lofty structure, consisting of two rooms on each floor, with a staircase tower to the east and a circular-ended turret opposite on the west face. A tiny oratory, containing in its traceried windows some beautiful old glass, opens northward from the hall on the ground floor. The house has been restored in recent times, but has not greatly suffered. It now contains some very beautiful old furniture. The return to Blois was made from Mur de Sologne, where a brief stay was afforded to examine the rather curious little church with fantastic slated spire and simple octagonal apse of good proportion.

Second Day—Tuesday.

A short railway journey, followed by a walk of about a mile, brought the excursionists to the entrance lodge of the Château de Chaumont, at which it was intended that the working day should be spent. In the troublous times of the Middle Ages Chaumont was an outpost of the Counts of Blois against their formidable enemies the Counts of Anjou and Touraine. Previously to the present building, which is a semi-fortified château built by Charles, brother of the Cardinal d'Amboise, about 1475, two feudal castles successively had been razed to the ground in the interminable wars of the rival nobles. The new château was originally a complete quadrangle, but the fourth side, towards the river, which was in existence in 1681, was pulled down by M. de Vaugien, a Parisian magistrate, to whom the domain belonged in 1739. By so doing he opened up the view over the Loire Valley, with (in the foreground) a "sweete island, deliciously shaded with tall trees," which the author of "Sylva" noted when passing "Charmont, a proud castle on the left hand" (of the Loire), in the course of his foreign tour. The building stands high above the river on a precipitous slope, and is approached somewhat curiously from the high ground behind by a gatehouse and drawbridge placed obliquely so as to enter at the angle of the courtyard. Flanking the gateway are two round towers with conical roofs, known respectively as the Tour du Roi and de Diane. At the north-west angle the tower of Amboise is largely of the earlier building, while at the north-east is yet another round tower. On the right of the entrance is a carved panel containing the shield of arms of Charles d'Amboise, and on the left those of his brother the Cardinal. Encircling the building is a curious frieze of emblems said to represent volcanos as a rebus of the place's name, alternating with a monogram of Charles and Catherine de Chauvigny. A fine polygonal tower facing the courtyard to the right of the entrance contains the escalier d'honneur, a spacious spiral stairway, flamboyant in all but its minor details. Mounting this stair and passing through the guardroom, the council hall is next reached. Here the attention is arrested by a remarkable floor of faïence, said to be from Palermo; interesting but not wholly satisfactory. In 1559 Catherine de Medicis bought Chaumont, which she held until the death of Henry II., when she compelled Diane de Poitiers to render up Chenonceaux in exchange. Chaumont somehow escaped the troubles of the Revolution, and contains a splendid collection of old furniture and tapestries, much of it original; Catherine's chamber in particular has very fine tapestries. Opening from this room is the chapel with gallery and shallow apsidal recesses converting it to a Greek cross plan. Adjoining is also the chamber said to be that of Ruggieri, Catherine's astrologer and poisoner, whose cabalistic signs are seen repeatedly about the castle. In his room is a fireplace with back lined with Delft tiles, which is the most pleasing detail seen in the building. Diane de Poitiers did not favour Chaumont, preferring her château of Anet, but her room is also shown, with a tile floor bearing her badge of interlaced crescents. The property is now owned by the Princess de Broglie, who jealously guards it.

Leaving Chaumont earlier than had been intended, owing to permission to sketch being withheld, the train was taken from Onzain to Tours, the headquarters for the remainder of the excursion. Always a place of considerable importance since Roman times, when as Cæsarodunum and afterwards Urbs Turonum it became the capital of a province, it is now a thriving city of some 70,000 inhabitants, and contains many fine buildings, modern as well as ancient. The railway terminus and the Hôtel de Ville, by Laloux, are among the most notable of the modern buildings, and both gain full effect from their setting, which is one of the things that "they manage better in France." There are other instances in the town of attention to town planning in the sense which it is so hard to get our English local authorities to recognise. The approach to the Pont de Tours by the fine open Place de Musée, with broad tree-shaded quays extending on either side, is one such. The many interesting ancient buildings of the city were necessarily given but scanty attention, owing to the demands of the programme of outside visits, which left but little time. The Cathedral of St. Gatien perhaps received most notice. This is the third church which has stood upon the site. Tours, it must be remembered, was the cradle of Gaulish Christianity. St. Gatien, to whom the cathedral is dedicated, was a missionary, but the second bishop, St. Sidonius, began the first cathedral, in which his successor, St. Martin, ministered. This was dedicated to St. Maurice, and when burnt in 561 was rebuilt by Gregory, to be again burnt in 1166. The present building was begun in 1170, and by 1260 the greater part had been finished and rededicated to St. Gatien. The western bays of the nave with the west front are of the XVth century, the towers having been begun in 1426. They are of unequal height in every stage, and terminate in Renaissance double cupolas completed in 1500 and about 1550

The Château, Chenonceaux.

respectively, 229 ft. and 226 ft. above the pavement. The flamboyant bays of the nave have some marvellous tracery embodying the fleur-de-lis, both in the glazed triforium and in the clearstory, and the stained glass in the church is very fine, though apparently much restored. How fine it could be is shown by the lower lights of the north transept rose, which as a sumptuous but not garish piece of colour is wellnigh perfect. Though the proportions and organic completeness of the structure are admirable, it is hard for English eyes to be wholly satisfied with the articulation of parts, the clustered piers, their capitals, and the arches they support appearing to lack that relevance characteristic of the best English work. Among minor details is a fine organ of the early Renaissance, occupying the end of the south transept. The lovely tomb of the children of Charles VIII., carved by Jean Jusk, is very charming. Adjoining the north transept of the cathedral is the cloister of the Psalette with its beautiful little stair turret. The Church of St. Julien, near the Rue Nationale, is a fine edifice of the XIIIth century, with a western tower of the Xth century, which does not rise so high as the ridge of the later church. The plan is remarkable, having a square east end with large eight-light window quite in the English manner, though this is the only English feature, the short choir of three bays, narrow transepts not rising to the ridge, and triple vault shafts which are corbelled above the capitals of circular columns in the choir, and stand upon the capital of a single shaft in the compound piers of the nave, being all thoroughly French. It is only in recent years that this church has been restored to its original purpose; it is not long since it served as stables to a hotel. Of the great XIth-century Church of St. Martin only two gigantic towers remain, separated by a street which was formed when the rest of the building was demolished in 1802. The Tour Charlemagne adjoined the north transept of the church and the Tour de l'Horloge formed part of the west front. Very few members found time to discover the Churches of St. Saturnin or St. Symphorien, and the former Church of St. François de Paule (now an American Kinematograph theatre) was inaccessible; the latter is a bold but rather coarse example of late Renaissance design. The house of Tristan l'Hermite, the Hotels Gouin and de Beaune, and several other notable buildings were not seen, but several members visited the former Hôtel du Consulat (now Palais du Commerce), attributed to J. H. Mansart. This building has an interesting court-yard, which derives a pleasing and individual character from the quadrant curved angles of the side facing the entrance. It is an excellent example of simple and restrained design. The street fronts of the more modern parts of Tours afford an admirable proof of the sufficiency of simple methods of design in the production of satisfactory town architecture. Most of the buildings are of two stories above the ground floor, with dormers above the main cornice. Quite usually the only ornament is in the wrought-iron balconies, most of which are very good, but all the details are well judged, and the total effect very sober and dignified.

Third Day—Wednesday.

The site of the Château of Chenonceaux appears to have been occupied in early times by a Roman villa. Later a feudal castle stood upon it and possessed as an apanage a watermill. The Marques family, to whom it belonged, sided with the English in the wars of the early XVth century, and as a reward Jean Marques's fortifications were razed by Du Guesclin. His successors, in their efforts to rebuild, got deeply involved in debt, and their property passed to Thomas Bohier, a rich financier, who, with his wife, Catherine Briçonnet (daughter of Cardinal Briçonnet), at once proceeded to demolish all existing buildings save the round tower, still standing detached beside the main entrance, and to rebuild in the newer fashion. The new work was complete in 1517, except the bridge across the Cher, which was added by De l'Orme for Diane de Poitiers about 1556. The château came into the possession of the mistress of Henry II. after it had become a royal domain under Frances I., consequent on the usual fate of Royal financiers. On Henry's death in 1559 Catherine de Medici ousted Diana. Evelyn visited the castle in 1644, and wrongly ascribed the whole building to Catherine, who only added or completed the stories over De l'Orme's bridge spanning the Cher. This bridge gallery was intended to form the connecting link between Bohier's house and another block of similar mass proposed to be erected on the eastern bank of the Cher, but, like so many ambitious schemes, it remained incomplete. The main block of the château shows the usual hybrid details of its time, and in so far as its qualities approximate to the mediæval is successful, but rather in spite of than by the aid of its Renaissance detail. The plan is of the simplest, and its charm seems due solely to the manner in which the structure is thrust forward into the very bed of the river, utilising the foundations of the old mill. A curiously vaulted corridor cuts the building in two, two rooms to the right and two to the left filling out the rectangle of the plan, which has the usual circular tourelles at the angles. The left-hand rooms communicate with two octagonal ended projections, one of which contains the chapel, with some good contemporary glass. The long gallery of Philibert de l'Orme, about 200 ft. by 20 ft., is a characteristic example of that master's ingenious detail and technical knowledge of construction. North-west of the château are fine sunk gardens, looking somewhat parched in the severe drought. After spending about three hours at Chenonceaux, the party proceeded by road to Amboise, the long drive through undulating country being very pleasant.

Of the once splendid Castle of Amboise only the outer walls, with two round towers, the small chapel of St. Hubert, and two proportionately insignificant, though still considerable, blocks of buildings are now standing, the greater part having been destroyed shortly after the Revolution. For knowledge of its perfect condition we are compelled to rely on Du Cerceau's drawing, which shows a strange medley of Gothic and Renaissance elements. Charles VIII. planted here, in 1495, the first colony of Italian artists and craftsmen, from whose fusion with the native school, reinforced by the subsequent introduction at Fontainebleau of a fresh band by Francis I., the characteristic French early Renaissance sprang into being. In the centre of the castle inclosure stood the mediæval collegiate church of Notre Dame, in which Leonardo da Vinci is said to have been buried, but this, in common with other buildings, has vanished. Louis XII. and Frances I. continued the works commenced by Charles, but later kings added little, and in the condition in which it was left by them it remained until the Revolution. Since the destruction which it then underwent the portions remaining have been restored at intervals, the chapel of St. Hubert having been first repaired under Louis Philippe. The buildings have lost interest in the process, but their historic associations (mostly of a sanguinary nature), and one or two beautiful and unspoilt details, still render them attractive. Perhaps the most beautiful thing remaining is the inclined vaulting supporting the sloping way in the Tour des Minimes, which, as Evelyn remarked, "is large enough and sufficiently com'odious to receive a coach and land it on the very towre, as they told us had been don." The gallery overlooking the river, from which Francis II. and his bride, Mary Queen of Scots, watched the massacre of some 1,200 Huguenot conspirators in 1560, is shown, but the whole of the river front has been almost rebuilt, and is very different in appearance either from Du Cerceau's drawing or the fine plate in Petit's "Châteaux of the Loire Valley." Beside the castle there are in Amboise a XVIth-century Hôtel de Ville, the two churches of St. Florrentin and St. Denis, and an old city gate (La Porte de l'Horloge), but time permitted no more than a hurried inspection in passing.

[To be concluded next week.]

GENERAL NEWS.

Notable Houses in London.

A tablet will be affixed upon the front of No. 12, Seymour-street, Portman-square, W., to commemorate the residence there of Michael Balfe.

Departmental Committee: Royal College of Art.

The Committee, to whose report we adverted in our last week's number (pp. 180-1), consisted of Mr. E. K. Chambers (Chairman), Principal Assistant Secretary, Technological Branch of the Board of Education; Sir George J. Frampton, R.A.; Mr. Halsey Ricardo, F.R.I.B.A.; Sir Charles Holroyd, Director of the National Gallery; Sir Kenneth S. Anderson; Professor Fredk. Brown; Mr. W. Burton, F.C.S; Mr. Douglas Cockerell, and Mr. Frank Warner.

King Edward VII. Memorials, Marienbad and Homburg.

The memorial which the British visitors have erected in the British Church at Marienbad consists of a tablet of giallo antico marble bearing a wreath of the rose, thistle, and shamrock, in high relief, over which is a bronze medallion of the late Sovereign sculptured by Mr. Stirling Lee. The design of the memorial is by Professor Lethaby; the carving was executed by Messrs. Farmer & Brindley. The marble tablet and bronze relief portrait that have just been placed in the British Church at Homburg were sculptured by Professor Gerth.

Scheme for East London College and People's Palace, Mile End.

The Charity Commissioners have framed a scheme for the future regulation of the People's Palace, an outcome of the original Beaumont Trust of 1840. The Commissioners set up a body of fifteen governors for administering the charity and endowments of the East London College; they ordain that the Drapers' Company, who are represented upon the Council, shall pay 7,000*l.* per annum to the governing body, with the option of commuting that subsidy for a capital sum of 30,000*l.* to be applied—if University education is then being carried on there—to the future maintenance of the College as the Board of Education may by scheme direct.

Sir Redvers Buller Memorial, Winchester Cathedral.

The memorial erected to Sir Redvers Buller by the King's Royal Rifle Corps, his comrades of both services, and other friends, will be unveiled in the north transept, Winchester Cathedral, on October 28. The recumbent effigy, in bronze, upon a tomb of green and black marble, is by Mr. Bertram McKennal, A.R.A.

Whiteley Homes Trust.

The trustees under the will of the late Mr. William Whiteley have decided to purchase from Lord Iveagh about 220 acres of land near Walton and St. George's Hill, Surrey, for the establishment of the Homes, with church, sanatorium, and administrative buildings. The land includes a portion of the Burgh Hill estate, is well wooded, and has a soil of deep sand and gravel.

Dyserth Castle, Flintshire.

In their second report, which has just been issued, the Royal Commissioners upon the ancient and historical monuments and constructions in Wales direct attention to the injury which is being inflicted, through quarrying operations, upon the remains of Dyserth Castle. The ruins stand upon a steep rock, which the owner has leased to the Castle Limestone Quarry Company, of Mostyn. Dyserth Castle, near Rhyl, an ancient British stronghold, was refortified by Henry III. in 1241, and dismantled afterwards by Llewellyn.

Antiquities of Asia Minor.

In view of the present condition of affairs in regard to the antiquities of Asia Minor, referred to in our issue of August 11 (p. 155), we are gratified to receive the information that a memorial to the Ottoman Government will shortly be despatched requesting that steps shall be taken for the protection of these monuments of past ages.

The text of the memorial is as follows:—

"To His Highness the Grand Vizier and Council of Ministers, Sublime Porte

Your Highness and Your Excellencies.

Without in any way presuming to interfere with the prerogative of Government, we very earnestly beg to appeal to your Highness and the Council of Ministers for the issue, by His Imperial Majesty the Sultan, of an Iradé, commanding that measures shall be taken throughout the Ottoman Empire for the protection and preservation of the ancient walls, buildings, temples, fortresses, and other archæological remains, which are universally recognised as being of the greatest possible value and interest to the artist and architect no less than to the scholar and the historian.

We feel sure that the Government of the Sultan cordially desires to take all possible steps for the adequate safeguarding of these precious monuments of antiquity, and that the Council will not misunderstand our motive in making this appeal. It is because we know the irre-

parable injury done by carelessness to the priceless memorials of the earlier decades of the last eight centuries that we hasten to petition for the effective protection of the works of past ages which, if destroyed, can never be replaced."

Those desiring to support this memorial should send their names to Mr. Arthur Phillips, 9, Northumberland-avenue, Putney, S.W.

Barnard Castle Sewerage.

The Barnard Castle Urban District Council have instructed Mr. Harry W. Taylor, A.M.Inst.C.E. (of Messrs. Taylor & Wallin), of Newcastle-upon-Tyne and Birmingham, to report upon the proposed improvement and extension of the existing sewers in the town, including various road improvements, etc.

BUNGALOW AT RADIPOLE, NEAR WEYMOUTH.

THIS bungalow, for Mr. Charles Raxworthy, R.N., is to be erected on the top of the hill at Radipole, on the west side of the Dorchester-road, and the site commands one of the finest views in the South of England, looking over Weymouth to Portland and the roadstead. The materials will be tiles for the roof, and red brick and rough-cast for the walls.

The architect is Mr. Vernon Hodge.

COMPETITION NEWS.

Stockport Police Courts.

Professor Reilly, the assessor appointed in the recent limited competition for police-station and courts at Stockport has now made his award, which is as follows:—

Selected design, No. 17—Messrs. J. Theo. Halliday & Claude Paterson, of Manchester and Stockport.

First Premium (100*l.*), No 11—Messrs. Appleyard & Quiggin, of Liverpool.

Second Premium (50*l.*)—Messrs. Stoll & Sons, of Manchester and Stockport.

The following are the terms of the assessor's award:—

"I have carefully considered the eighteen designs submitted by selected architects in answer to your invitation to compete for a scheme of police-courts and other police accommodation on a site in Wellington-street.

I have pleasure in congratulating you on the excellent results of your invitation. A large number of very capable designs have been sent in which, together with the complexity of the problem, has made the task of assessing no easy matter. I have, however, no hesitation in placing first the design numbered 17. I am of the opinion that, with due care, this design can be erected for the money available. I award the first premium of 100*l.* to the design numbered 11, and the second premium of 50*l.* to the design numbered 12."

The cost of the proposed buildings is 25,000*l.* The designs have been on view in the town hall during the present week.

Technical Institute, Cardiff.

Questions relating to this competition must be sent to the Director of Education, City Hall, Cardiff, before September 15, and the last day for receiving designs is November 30. Mr. J. S. Gibson, F.R.I.B.A., is the assessor. The cost of the buildings, including heating and ventilation, electric light wiring, gas and water supplies, is not to exceed 36,000*l.* Fittings or equipment and boundary walls or railings are not to be included in the estimates. The author of the design placed first will be employed as architect to carry out the work unless in the opinion of the Committee, after consultation with the assessor, there is some valid objection to his employment. The author of the design placed second will be paid a premium of 125*l.*, and there will be third and fourth premiums of 75*l.* and 50*l.* respectively.

East Sussex Hospital, Hastings.

The assessor in this competition, open to all architects in the United Kingdom, will be Mr. Edwin T. Hall, F.R.I.B.A. The maximum cost of the building is placed at 35,000*l.*, and designs must be sent in by November 30. Any questions should be submitted by September 15. The author of the design placed first will receive 125*l.*, and sums of 75*l.* and 50*l.* will be awarded to the architects of the two next best schemes.

Designs for Government Palace and for Town Improvements, Uruguay.

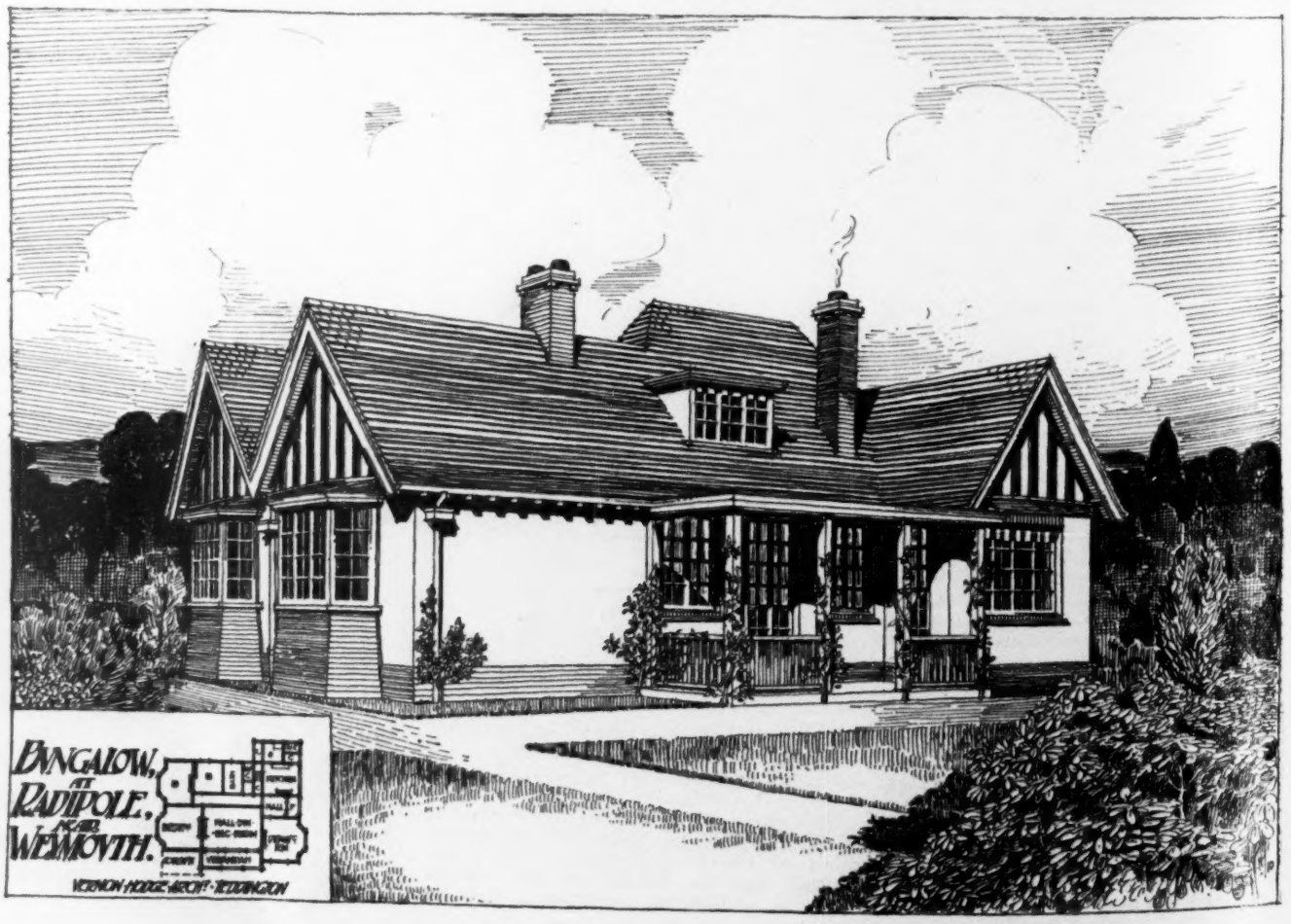
With reference to the notice on pp. 612-3 of the *Board of Trade Journal* of June 22 relative to a scheme for town improvements and a new Government palace at Montevideo, H.M. Minister at that place now reports that competitive designs are invited by the "Ministerio de Obras Publicas," Montevideo, up to January 30 and 29, 1912, respectively, for the Government Palace and town improvements. Prizes of 10,000 and 4,000 pesos (about 2,125*l.* and 850*l.*) are offered for the best plans for the Government Palace, and prizes of 5,000, 3,000, and 2,000 pesos (about 1,060*l.*, 640*l.*, and 425*l.*) in respect of the town improvement plans. A statement of the conditions of the competition (in Spanish) may be seen by British firms at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

BOOKS.

The Corrosion of Iron and Steel. By J. NEWTON FRENCH, Ph.D., D.Sc., F.C.S. (London: Longmans, Green, & Co. 1911. Pp. 300. 6s. net.)

WITHIN recent years much attention has been directed to the effect of the numerous factors connected with the corrosion of iron and steel, and since wrought-iron has been almost entirely superseded by mild steel, the smaller resistance of that material to corrosive influences has been made the subject of careful investigation. The object of the author in writing this work was the collection and presentation in convenient form of all reliable material bearing on the corrosion of iron and steel in order that makers and users alike may have a record of what is already known of the subject, and the directions in which further reasearch is desirable. The task of collecting data scattered through some hundreds of papers and articles has obviously involved much labour, and the result is one which we are sure will be widely appreciated.

Of the five theories of corrosion advanced from time to time, only two, the acid and electrolytic theories, are considered, as the others have already been proved inadequate. The author shows that the most recent experimental results are entirely in favour of the acid theory, and while rejecting the electrolytic theory he points out that the electrolytic theory of ionisation—or the ionic theory as he prefers to call it—is not to be excluded. The effects of various substances and agencies in promoting and retarding corrosion are fully discussed, and the work concludes with a chapter on the relative rate of corrosion of iron and steel. Perhaps some of our



readers may be interested to know that the author is contemplating the issue of a companion volume dealing with the protection of the same metals, this being a subject of great practical interest to architects and engineers alike. The present volume, however, is one of which we cannot speak too highly.

Calculation of Columns. By THEODOR NIELSEN. (London: E. & F. N. Spon, Ltd. 1911. Pp. 36.)

THIS treatise appears to have been written chiefly with the object of expounding the results of the investigations made by Professor Ostenfeld, of Copenhagen, and to show how these may be applied to the calculation of steel and other columns. As our readers are aware, there are already numerous column theories and formulæ, most architects and engineers having their own favourite variety in general use. The methods given in this book are certainly simple; they can be readily used for columns under various working conditions, and, so far as we have examined them, they appear to be safe and reliable. Some interesting diagrams at the end show the relative agreement of the author's and other formulæ with groups of test results, the last of the series furnishing a comparison of generally-used formulæ. While of decided interest as a study of column design, the practical convenience of the book is somewhate diminished by the adoption of metric units throughout.

A Glossary of Building Construction. By CHAS. H. GREGORY. (London: J. Haslam & Co. 3s. 6d. net. Pp. 136; 22 illustrations.)

THIS is a short glossary of terms used in building work arranged on a somewhat novel principle, the trades being considered independently, and the more important terms arranged alphabetically under each heading and briefly explained.

The author describes the book as a short introduction to the science of building construction, but it will probably be found more useful as a commentary on the existing text-books than as a self-contained primer of construction. The information given appears to have been carefully considered, and is set out in a clear and straightforward way, many of the definitions being explained by drawings, which, by the way, might have been greatly reduced in size to permit the inclusion of a larger number of terms. In the sections on calculations and the design of small buildings we are inclined to think that the author has trespassed beyond his sphere; these are subjects of a much more advanced character than the rest of the book, while the information given on design is too meagre to be of any really practical value.

Building Superintendence. By EDWARD NICHOLS. (Chicago: American School of Correspondence. London Agents: Crosby Lockwood & Son. 6s. net. Pp. 200; 260 illustrations.)

THE building methods of the United States differ in so many respects from our own that we question whether this new book on supervision, although containing many useful hints, will be found of any great value to the British architect or clerk of works, and some of the points made, might prove misleading to students. Nevertheless, the book is vigorous in tone, and suggests a degree of method in supervision which would prevent many oversights and delays.

Modern Brickmaking. By ALFRED B. SEARLE. (London: Scott, Greenwood, & Son. 12s. 6d. net. Pp. 430; 260 illustrations.)

IT frequently happens that able writers on technical subjects cannot speak with the authority of long practical experience, while those who have the practical knowledge have not the power of expressing it in books. We are grateful to Mr. Searle for giving us the benefit of his wide experience in the brick industry in a well-written and interesting volume. *Modern Brickmaking* will be of great service to those directly interested in the trade, and the engineer and architect will gain much by a perusal of its pages. Although no one book on so large a subject could be called exhaustive, the author has contrived to give a great deal of valuable information on each branch of the industry; the descriptions of the many types of machines used in each process, accompanied by hints as to their relative merits for differing conditions, will save manufacturers from many a mistake in laying down new plants, and the chapters on kilns and firing will prove not less valuable. The book is admirably illustrated by drawings and photographs.

Sewerage Systems: Their Design and Construction. By HUGH S. WATSON. (London: Crosby Lockwood & Son. 10s. 6d. net. Pp. 300; 148 illustrations and diagrams.)

THE simultaneous publication of two works on the town sewage problem which do not materially overlap in subject matter is an indication of the great amount of attention which is being paid to this vitally-important question. Mr. Kershaw's book noticed above deals principally with the disposal of the sewage after it has reached the works; *Sewerage Systems* reviews the methods of conveyance, and, without presuming to be a complete treatise, is fairly comprehensive in its sphere, intelligible to lay readers or students, and well arranged. The subject is treated in five sections—the general design, the preparation of a scheme, the process of construction, maintenance, and legal considerations, with an outline specification, draft regulations, and various forms of notice in appendix form.

Modern Methods of Sewage Purification. By G. BERTRAM KERSHAW. (London: Charles Griffin & Co., Ltd. 21s. net. Pp. 356; 36 plates, 12 text illustrations.)

THIS is a welcome addition to the already large library of books dealing with a problem which is every year demanding more attention and presenting greater difficulties. Mr. Kershaw brings to the work an exceptionally wide experience, and has consolidated a large stock of information in a very readable form. There are chapters on all the more important aspects of a very wide subject, and the various systems of treatment and their adaptability to particular conditions are discussed in considerable detail. The disposal of sludge, the land treatment of sewage, the construction of contact beds, the many considerations affecting the success of percolating filters, and so on, are all dealt with from an eminently practical standpoint, and to all who are interested in the management of sewage works the chapters on these and other subjects should be of great interest and assistance.

How to Manage a Suction Gas Producer. By W. A. TOOKEY. (London: Percival Marshall & Co. Pp. 90. 1s. net.)

WRITTEN as a practical handbook for engineers and attendants, this little book gives very explicit directions for the management of suction gas-producing plant. Every part of the apparatus is described and illustrated by sectional drawings. The matter is arranged under convenient headings and sub-headings to facilitate reference, and we have confidence in recommending the guide to those who have the care of suction gas plant, or who wish to make themselves familiar with its construction and arrangement.

A Treatise upon the Law of Light, including an Exposition of the Law Relating to the Nature, Acquisition, Preservation, and Extinguishment of the Easement or Right to Light and the Remedies Afforded for the Protection of Window Lights. By R. G. NICHOLSON COOMBE, M.A., LL.M., Barrister-at-Law. (London: Butterworth & Co. 1911.)

THE author of this new work on the law of light in his Preface almost apologises for dealing with a subject relating to an easement, seeing the excellence of the existing text-books dealing with easements in general, but he explains that the law of light has always stood, as it were, apart, and that the application of the Prescription Act, 1832, has added to its isolation. As far as we can see, no apology is required for the text-book that he has produced on this branch of the law, which seems written with care and very lucidly expressed. As the author observes, the effects of the decision of the House of Lords in Colls *v.* Home and Colonial Stores, although that case was decided some seven years ago, are so far-reaching that it is possible that even yet they are not fully appreciated, and for this reason, if for no other, it appears that the opportunity is very favourable for the production of an exhaustive text-book like that now before us.

The author throughout his treatise has adopted two expressions which we agree in thinking both accurate and convenient. The accessorial right to light he terms "light easement," and an obstruction which amounts to an actionable interference with the light he terms "light nuisance," the latter term no doubt being suggested by the findings in Colls's case.

The volume is presented to the reader in a very attractive form; the type is clear and so varied as to readily mark the sub-division of the paragraphs and to attract the attention, and there are side-notes and footnotes, the titles of the cases referred to in the text being printed in the latter. There are tables of statutes and cases, the table of cases containing also references to the reports in which the cases are to be found. There is also a copious index, but in one instance we have found it defective, as it is difficult to find the reference to an extraordinary or special user of light, although this subject is dealt with fully in the text in Chapter II., sect. 4. The whole work appears to us to be an unusually clear, interesting, and exhaustive exposition of a very complicated branch of the law.

Public Health Law: Being a Manual for Municipal and County Engineers and Surveyors, Town Clerks, Clerks to District Councils, and other Officers and Members of Local Authorities. By SIDNEY G. TURNER, Barrister-at-Law, Associate Member of the Institution of Civil Engineers, Graduate of the Institution of Municipal and County Engineers, etc. (London: St. Bride's Press, Ltd. 1911. Pp. 216. 10s. 6d. net.)

ON his title page the author has particularised the class of readers which he desires to reach, but as the title of the book itself is somewhat general we may say that it is divided into twenty chapters, each dealing with a special subject, such as drains and sewers, sewers and sewage disposal, rivers' pollution, nuisances, new streets, housing, etc. There is also a chapter on highways, although the author points out that this, amongst one or two other subjects, is not strictly included under public health. The volume does not deal with the law peculiar to the Metropolis, except in so far as cases decided under Metropolitan Acts have any bearing on the subjects dealt with. There is a table of statutes, a table of cases, with full references to the reports, and an index. The text is clearly expressed and presented in an attractive form, and, so far as we have been able to see, the law is stated with accuracy. In so small a volume it is a pity that the addenda and corrigenda should have to run to nearly two pages, and in this table correction is made more irksome by a departure from the numerical order of the reference to the pages.

The Holidays: Where to Stay and What to See. (London: Walter Hill, Southampton-row, W.C. Price 1s.)

THIS is the sixteenth edition of a work which consists of a collection of lists of seaside, farmhouse, and country lodgings, hotels, and boarding-houses, etc., in the districts served by the Midland, London and North-Western, Great Northern, Great Eastern, Great Western, and Great Central Railway Companies, together with information for tourists, and holiday-makers. It is a useful work for all who may be considering the question of where to stay for the holidays, and it contains, besides much information of use to tourists and others, some good photographic illustrations and maps.

The London Citizen's Year-Book, 1911-12. (London: G. Allen & Co., Ltd. 6d. and 1s. net. Crown 8vo.)

THIS is a handy and useful little work, containing particulars of London's local authorities, expenditure, and other information on London questions. The aim of the book is to describe the work of London government, its machinery, cost and problems of local administration and taxation, and all references to the pages of the year-book which we have made justify us in stating that the aim has been amply fulfilled.

EDITORIAL SUMMARY.

"Concerning Bruges" is the title of our leading article, which is illustrated.

Notes (p. 209) include: "Strikes and Electric Lighting"; "A Lesson of the Strike"; "New Method of 'Building'"; "Hygiene of the Eye."

The third illustrated article of our series on "The Story of the Bridge" is given on p. 210. Other illustrations in connexion with the article are given in one of our plates.

The annual excursion of the Architectural Association has been held this year in France, in the district of old Touraine. An illustrated description of the excursion is commenced this week, p. 212.

Book notices (p. 216) include: "Sewerage Systems"; "Sewage Purification"; "Brick-making"; "Building Construction"; "Building Superintendence"; "Corrosion of Iron and Steel"; "Calculation of Columns"; "The Law of Light"; "Public Health Law," etc.

Some notices of the August Magazines appear on this page.

The Monthly Review of Engineering (p. 219) contains: "The Pennsylvania Railway Station" (with illustrations); "Buildings for Explosives Works"; "Some Studies of Welds" (illustrated); and Notes.

The Building Trade Section (p. 224) includes: "Stucco"; "Legal Questions about Extras"; "Government Contracts"; "Projected New Buildings in the Provinces"; "General Building News," etc.

"Quantity Surveyors in South Africa" is the title of an article on p. 227.

Some notes on a new metal filament lamp are given on p. 229.

In Law Reports (p. 232) the case of "Contractors' Action against Building Owner" is continued.

MAGAZINES AND REVIEWS.

THE *Art Journal*, with number of pages increased and with price reduced to 1s., seems to be giving more attention than before to non-pictorial subjects, a policy which should extend its influence. Part 2 of an article on Holkham, in a series on "Interiors of English Mansions," includes some well-selected details and a fine view of the Great Hall, remarkable for its lofty magnificence and its fluted columns enriched with variegated alabaster. William Kent's original design for the front of Holkham is an illustration of great interest. The statuary in this famous mansion is described; it forms an integral part of the scheme for decoration, the sculpture gallery particularly being planned for the reception of the works collected by Thomas Coke, first Earl of Leicester. The "Kent" furniture at Devonshire House is the subject of another article, and altogether this number is a tribute to the versatility of the architect, painter, decorator, garden designer, and general artistic referee who flourished under the wing of Lord Burlington. That Kent was too miscellaneous to be continually inspired must be the thought of all those who study his work. Of his talent, however, there can be no doubt. The lacquer screen, reproduced in colours, is a gorgeous piece of Oriental design, and among other illustrations may be mentioned pictures by Sir James Guthrie, P.R.S.A. An article by Sir Claude Phillips on "Rubens or Van Dyck?" refers to the stately "Portrait of a Genoese Nobleman" in the Dulwich Gallery.

The *Burlington Magazine*, in its editorial on the Edward VII. Memorial, criticises the decision of the Committee to place the monument at the Piccadilly end of the Broad Walk, and reminds us that "the only excuse for destroying the chief feature of the Green Park was that by so doing a vista was obtained of the Victoria Memorial from Piccadilly. The proposal to place the King Edward Memorial in this walk destroys the vista and the excuse for the walk itself." The method of selecting the sculptor is very severely condemned. "We have already expressed our opinion that the arbitrary selection of an artist by a committee of gentlemen, who, however distinguished in other capacities, have no special qualifications for such a duty, will be an injurious blow to the interest and welfare of British art. We maintain that, in spite of the Royal Academy and other stumbling-blocks to progress, there exists in this country a sufficient number of artists who are fitted and entitled to show their mettle, and compete in the case of any national commission for a work of art. We have also stated that the choice of Mr. Bertram McKennal, A.R.A., might prove justifiable, even in a national competition. We are compelled to modify this statement in view of the fact that in those commissions which have already been showered upon him by the Government—the new coinage, the Coronation medals, and the new postage-stamps—Mr. McKennal has not shown any qualities as an artist which would justify him for exclusive selection as an exponent of XXth-century British art." An illustrated article on "Hispano-Arabic Art" at Medina Az-zahra refers to recent excavations. Comparisons are made between various forms of ornamentation, and the specimens are interesting in relation to early Mohammedan art.

The *Studio* gives first place in its pages to a well-illustrated article on the recent work of Mr. J. W. Waterhouse, R.A. The illustrations of Old Danish carved furniture of the XVIIth century and later periods show the earlier work to be akin to our Jacobean, while in later examples the more vernacular style reasserts itself. Some notes on the water-garden will interest the amateur, and the work, Jaromir Stretti-Zamponi, of which illustrations are given, displays a strong sympathy with the architectural subjects selected, mainly from the picturesque city of Prague. The remarkable ability displayed in the work of Mr. E. L. Laurenson is also worthy of careful attention. Altogether this issue reaches a very high standard.

The *Connoisseur* contains a very interesting article, with numerous illustrations, on German faience stoves, some of those given being of striking merit as architectural compositions. We regret that we cannot congratulate this magazine on the numerous coloured plates it publishes, one in particular, black medallions on a red background, being particularly glaring and unsatisfactory.

Books on Gothic and Renaissance Architecture published during the last few years are dealt with in the *Quarterly Review*. Mr. W. G. Waters, in his article, does not note any special facts to be disproved, though he thinks Professor Blomfield is mistaken in his view that when Wren went to Paris in 1653 the Louvre was being built by Bernini—"the plan accepted was that of Charles Perrault." The concluding paragraph is pessimistic:—"In old times, when the triumphs of the builder's art were raised, men desired beautiful houses for habitation and stately fanes for prayer: but in this age of rush and luxury they yearn chiefly after hotels and restaurants of Sardanapalian splendour, and motors, still more elaborate, to whirl them from one scene of revelry to another. It is upon work of this sort that the ingenuity of the constructor of to-day is chiefly engaged, and if the results of his labour fail to rival those of the master builders of the XIVth century in artistic merit, it will not be because he has spent less money upon them."

The *Century* includes part of an illustrated article on "Motoring in Algeria and Tunis." Biskra impressed the author, and so did the ruins of Timgad, a city which, in his mind, "stands to-day as the most interesting, the most touching and fascinating place in North Africa. Founded in the year 100 in the reign of the Emperor Trajan, Timgad lies now a ruined dream city. The theatre is set against a small hill, and over 3,000 people could be seated at the play. At the extreme end of two intersecting avenues stands Trajan's Arch."

In the *Revue Générale*, M. Arnold Goffin deals with the influences now governing the direction of decorative art. M. Goffin's wide knowledge of the history of decorative painting renders his views on the more modern developments worthy of especial attention, and he deals with his subject in a broad and sympathetic spirit.

ILLUSTRATIONS.

Pennsylvania Railway Station, New York.

THESE illustrations of an important work by Messrs. McKim, Mead, & White are given in connexion with the first article in our Monthly Engineering Review this week (see next page).

"The Story of the Bridge."

THESE illustrations of Mediæval bridges are given in connexion with our third article on "The Story of the Bridge," p. 212.

FIFTY YEARS AGO.

From the *Builder* of August 24, 1861.

The First Trades Union Directory.

CERTAIN short documents, bearing upon thepresent disputes between the building operatives and their employers, have recently appeared in some of the journals as emanating from the Trades Council. And now, what is this London Trades Council? It is a body that had its germination from those meetings of the various trades delegates of the metropolis which took place at Shaftesbury Hall during the greater part of the builders' strike of 1859. The parties who had there for so long assembled merged themselves, at the time when the strife was ended, into a provisional council or committee, on whom the joint duty was to devolve of furnishing a code of rules whereby any such council was to be guided in future; and also to prepare and have printed as correct and full a list of such trades as were united among themselves—their places of meeting and the names of their secretaries—as was possible; and which at length has been accomplished under the title of "The United Kingdom's First Annual Trades Union Directory." Its publisher is Mr. Thomas Jones, of Great Chapel-street, Soho; and whose name also appears among the seven attached to an address on the 104th page; these parties making their statement at this concluding part of the work, in lieu of the usual prefatory matter to be found at the commencement of books. It is the "first" thing of the sort which has been consigned to the long-living operations of the printer's skill. From the index we gather that there are 405 cities and towns in which are to be found those now widely-spread and thickly-clustered confederacies of workmen with workmen, of which we have lately heard so much and are likely to hear more.

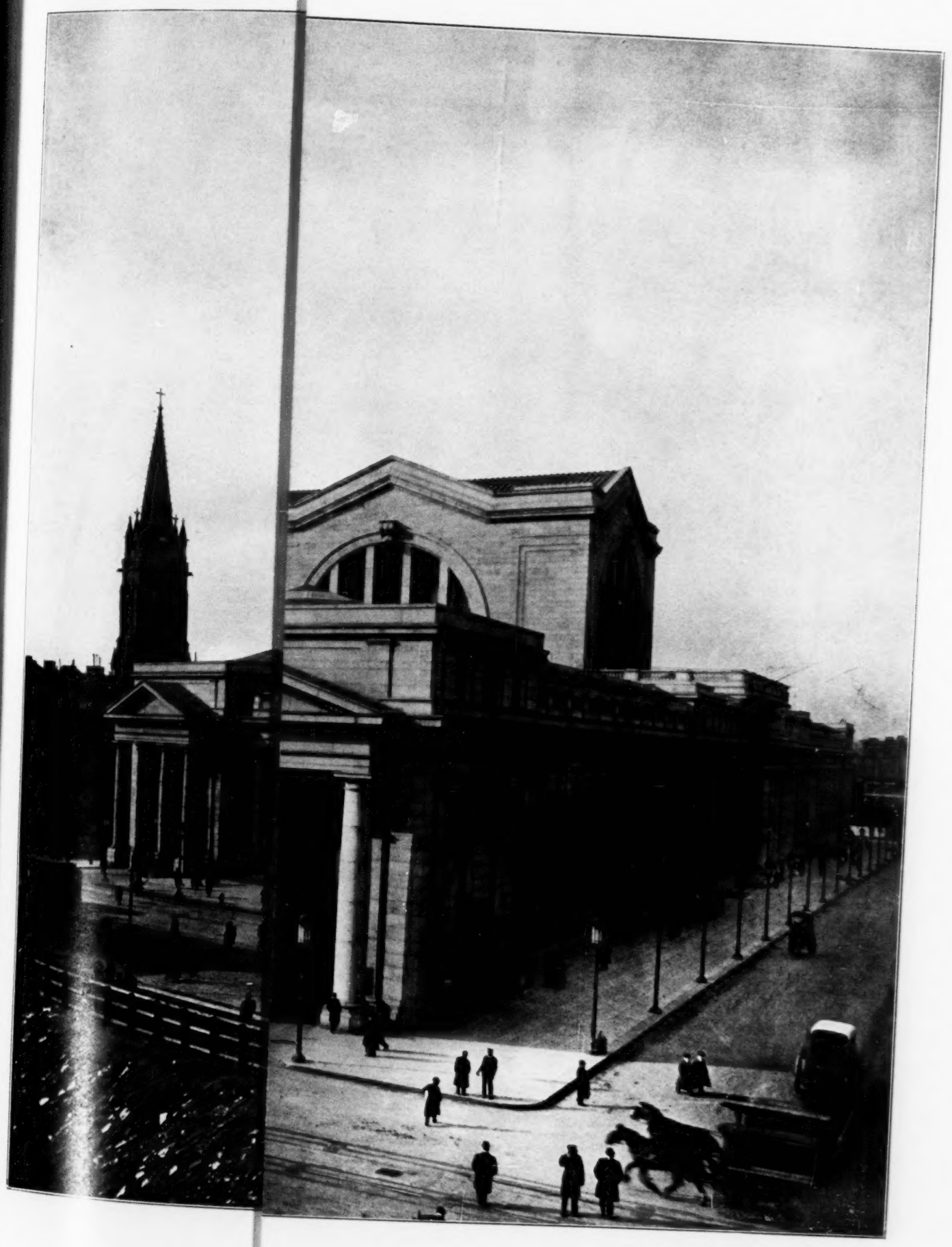
CORRESPONDENCE.

Parks and Public Conveniences.

SIR,—When a town park is made (as that proposed at Shadwell, for instance) it usually happens that some small part of it is needed for a building for tools, stables, or public sanitary convenience. As every square foot withdrawn from verdure is to be deprecated, I suggest that the constructive people among your readers could easily design and construct an erection of ordinary brick arches (or iron and cement perhaps) which would supply the needed business space, covered, lighted, and ventilated, but of such a nature that outwardly it might form a picturesque little hill or "rockery," covered with shrubs, evergreens, and creepers. Inwardly useful and outwardly a beautiful feature of the park. It might even have an elevated walk or terrace, where seats give a view over the park. Where the land is flat this feature is specially desirable.

When I see the many clever things done by builders a matter of this kind does not seem to offer any difficulty. But I have never seen it tried. Why not? Many public conveniences might be better thus, less below ground and more attractive above. Surely this method is not more costly?

AN ORDINARY CITIZEN.



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rom the *Builder* of August 24, 1861.

The First Trades Union Directory.

RTAIN short documents, bearing upon resent disputes between the building atives and their employers, have recently ared in some of the journals as emanat- from the Trades Council. And now, is this London Trades Council? It is dy that had its germination from those ings of the various trades delegates of metropolis which took place at Shaftes- Hall during the greater part of the ers' strike of 1859. The parties who there for so long assembled merged selves, at the time when the strife was d, into a provisional council or com- e, on whom the joint duty was to lve of furnishing a code of rules whereby uch council was to be guided in future; also to prepare and have printed as rt and full a list of such trades as were d among themselves—their places of ing and the names of their secretaries— as possible; and which at length has accomplished under the title of "The d Kingdom's First Annual Trades n Directory." Its publisher is Mr. as Jones, of Great Chapel-street, Soho; whose name also appears among the attached to an address on the 104th these parties making their statement is concluding part of the work, in lieu e usual prefatory matter to be found e commencement of books. It is the " thing of the sort which has been gned to the long-living operations of the r's skill. From the index we gather here are 405 cities and towns in which be found those now widely-spread and y-clustered confederacies of workmen workmen, of which we have lately so much and are likely to hear more.

CORRESPONDENCE.

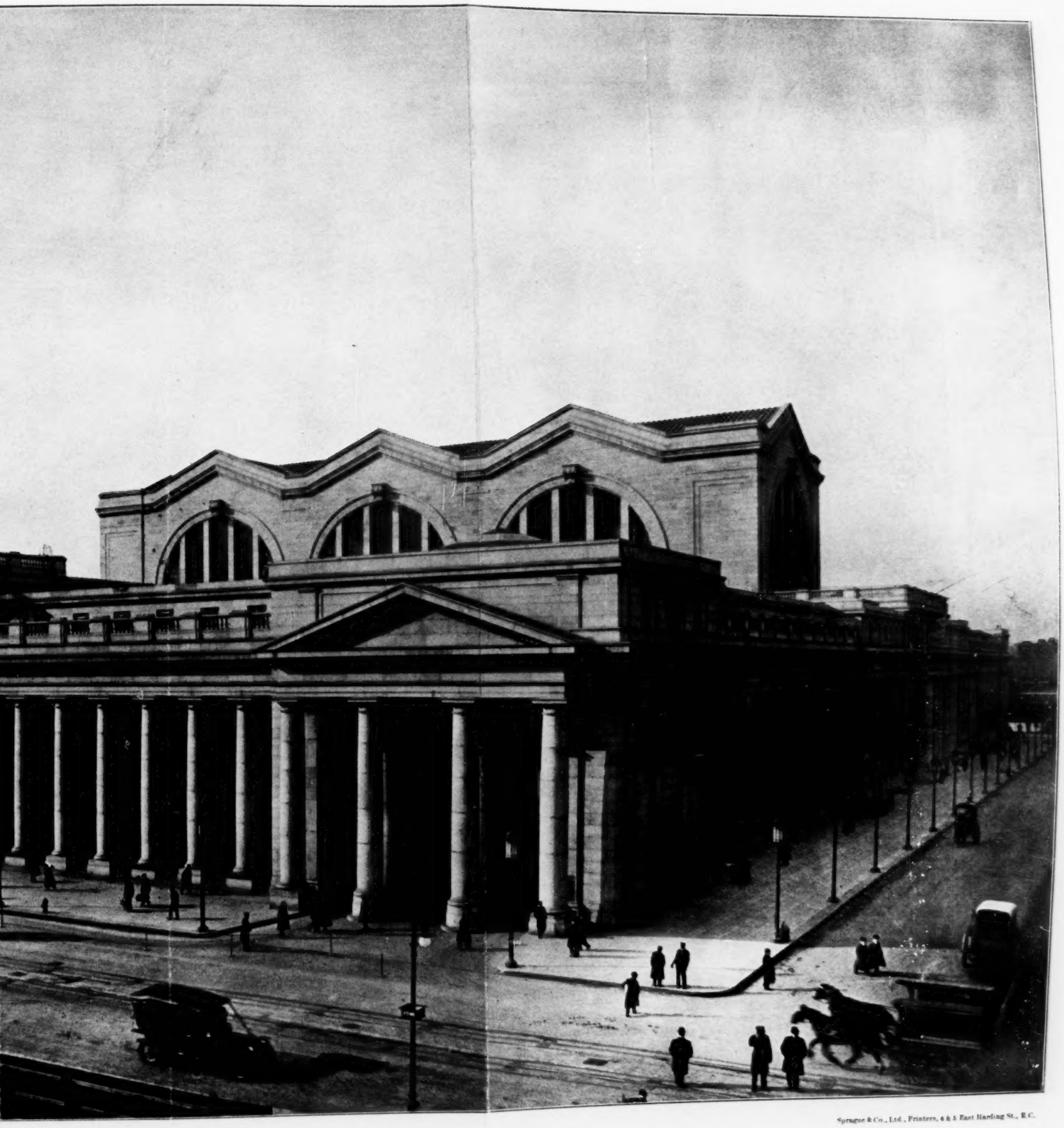
Parks and Public Conveniences.

—When a town park is made (as that ed at Shadwell, for instance) it usually ns that some small part of it is needed building for tools, stables, or public ry convenience. As every square foot awn from verdure is to be deprecated, rest that the constructive people among eaders could easily design and construct ction of ordinary brick arches (or iron ment perhaps) which would supply the l business space, covered, lighted, and ted, but of such a nature that out- it might form a picturesque little hill ckery," covered with shrubs, evergreens, eepers. Inwardly useful and outwardly tiful feature of the park. It might even n elevated walk or terrace, where seats view over the park. Where the land this feature is specially desirable.

n I see the many clever things done lders a matter of this kind does not o offer any difficulty. But I have never t tried. Why not? Many public con- ces might be better thus, less below and more attractive above. Surely ethod is not more costly?

AN ORDINARY CITIZEN.

PENNSYLVANIA RAILWAY STATION, NEW YORK: EXTERI



Sprague & Co., Ltd., Printers, 4 & 5 East Harding St., E.C.

N, NEW YORK: EXTERIOR.—MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK.

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Photo by Lacoste, Madrid.

PUENTE DE SAN JUAN DE LAS ABADESAS, GERONA.

"THE STORY OF THE BRIDGE."—III.

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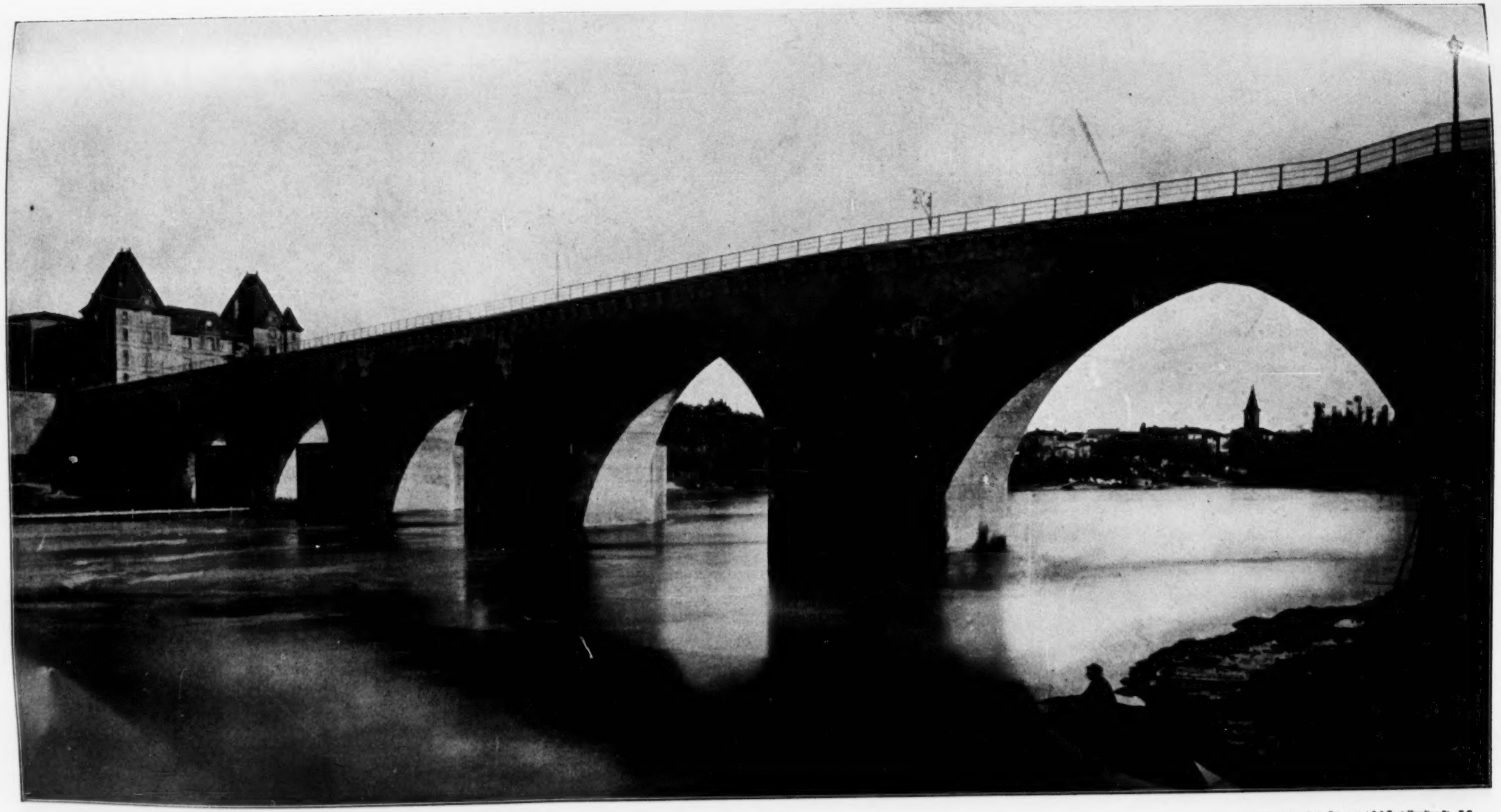

Photo by Neurdein Frères, Paris.

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PONT DES CONSULS OVER THE TARN, MONTAUBAN (XIVth CENTURY).

"THE STORY OF THE BRIDGE."—III.

MONTHLY REVIEW · *of* · ENGINEERING.

Pennsylvania Railway Station, New York: Main Waiting-Room.
Messrs. McKim, Mead, & White, Architects, New York.

THE PENNSYLVANIA RAILWAY STATION, NEW YORK.

FOR many years past the only railway system directly connected with New York City has been the New York Central Railroad and allied lines.

The Pennsylvania Railroad Company have lately completed a comprehensive project, including the construction of tunnels under the Hudson River and the city of New York, a gigantic underground station in the middle of the city, and tunnels under the East River. A view of the station building is shown in one of our plates.

By the execution of these and auxiliary works a direct route has been opened up between the New England States and the West by way of New York City, the new railway-station being not only an immense convenience, but also a notable architectural addition to the mercantile capital of the United States.

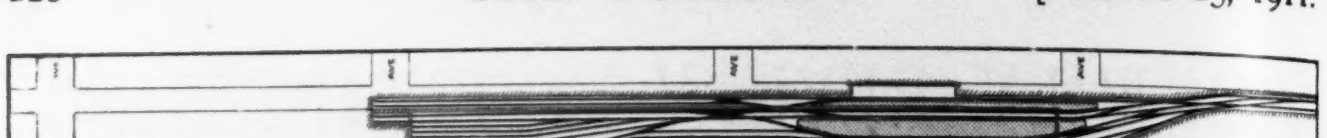
The most impressive feature of the scheme is the station in New York, situated between Thirty-First and Thirty-Third streets, and extending lengthwise from Seventh to Tenth avenue, as shown in Fig. 2; the railway lines, about 40 ft. below street level, comprise twenty-one tracks serving eleven platforms. The area devoted to traffic requirements covers some 28 acres, and includes storage space for nearly 400 passenger carriages.

The site of the works was formerly occupied by five large blocks of buildings, its clearance involving the demolition of 500 houses. The work of excavation to the average depth of 50 ft. below street level involved the blasting of about 3,000,000 cubic yds. of rock. Afterwards it was necessary to build retaining walls to the collective length of 7,800 ft., to divert sewers, gas and water mains, and other conduits, and to execute numerous incidental but important works inseparable from the excavation of so huge a pit in the heart of a great city. As the level of the rails is from 7 ft. to 10 ft. below high-water mark in New York Harbour an elaborate drainage system had to be established over the entire area of the station.

Reference to the plan (see next page) will show that two important streets—Eighth and Ninth avenues—pass over the underground station, these and parts of other streets and avenues being carried on bridges, the total length of which is 4,400 ft., and the corresponding street area 8 acres.

In order to ensure suitable architectural treatment Mr. William R. Mead, of the firm of Messrs. McKim, Mead, & White, was associated with the Board of Engineers appointed by the railway company.

Considered from the structural standpoint, the station building above street level is virtually a monumental bridge over the



Pennsylvania Railway Station, New York: Block Plan of Sub-station.

underground lines with entrances from the streets on all four sides. In the latter respect the building is far more accessible than any structure of the same class in the world.

In dealing with the exterior, the architects aimed at the realisation of two main features—to impart to the building the character of a monumental entrance and gateway to a great metropolis and to make the exterior suggestive of the purpose which the building was intended to serve.

The reader may judge for himself the happy way in which these ideas have been embodied by reference to the exterior view (see plate), which was taken near the intersection of Seventh-avenue and Thirty-Third-street.

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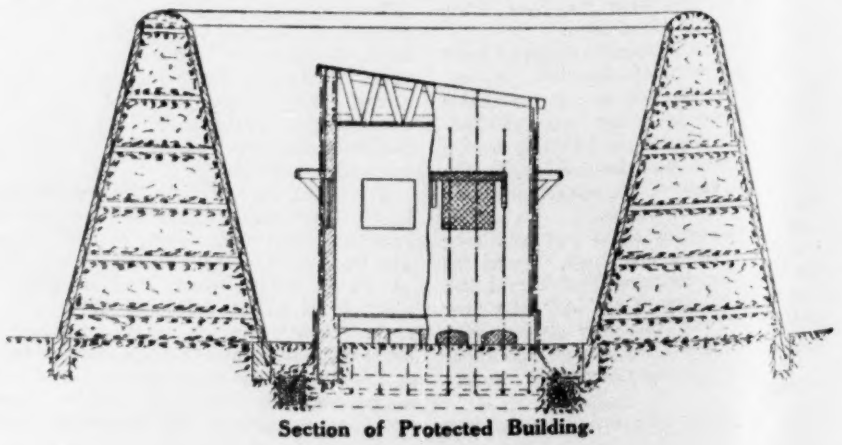
This latter principle is expressed in the Explosives Act of 1875, which was due to the efforts of the late Sir Vivian Majendie, and it was thereupon adopted by many other countries.

To attain this object, in France buildings are made with strong walls on three sides,



Section of Protected Building.

whilst the fourth consists of glass. In Great Britain and Austria and Hungary wooden buildings, originally with light, felt-covered roofs, and later on, chiefly in the case of magazines, with corrugated iron sides and roofs, were preferred. In Germany the buildings were still of light wooden construction, but the roof is sometimes put on quite loosely, being held by two or four wooden pins only, so that in case of an explosion the roof is simply lifted off, and the sides are supposed to remain intact, which never happened, except in black powder houses containing very small charges. In this country mounds need only exist on those sides which are within a specified distance from a building not so protected, and then they need only reach to the eaves of the building. In most other countries, the mounds must be at least 1 yd. higher than the highest point of the roof, and must surround the building on all sides, even the access to the building being formed by means of a tunnel.

It is the rule to maintain a definite distance between each building in order to minimise damage. This distance is regulated by the quantity of explosive contained in the building, but for practical purposes varies very little, 50 yds. to 52 yds. being the average for mounded buildings of high explosive works (except cartridge huts).

Mr. O. Guttmann's method is to construct the buildings of reinforced concrete made with an aggregate of fine river gravel. In order to prevent the roof being penetrated by flying *débris*, it consists of two layers of armoured concrete with a layer of sand between them. Similarly, armoured concrete is used for the surrounding mounds and for the passages leading through them to the buildings.

In a German powder-factory a trial building in accordance with these particulars was constructed, in order to prevent the transmission of fire from one portion of a packing-room to another, and the experiments made in this building were a complete success. This showed that for buildings exposed merely to fire risks the above outline of construction was quite sufficient; but, where there is risk of explosion, Mr. Guttmann finally adopted a modified form of roof.

The considerations leading to this modification were that the cohesion of armoured concrete might be so great that pieces of appreciable weight might be thrown about, and that the possibility of sand becoming admixed with explosive material in the event of an explosion was not desirable. Accordingly, in planning in 1908 and 1909 new buildings for a German factory, Mr. Guttmann discussed the subject with Privy Councillor Mente, of the Prussian Ministry of Commerce.

The walls only of the buildings were to be of ordinary concrete with river gravel aggregate, this being sufficient to protect them from flying pieces of *débris* and from the shock due to an explosion some distance away. The roof, on the other hand, in place of armoured concrete, was to be made of light, yet strong, wooden principals covered over with expanded metal, wire netting, or similar material. This network was to be provided both on the outer and inner sides of the main rafters, and since protection against lightning was thereby afforded at the same time, the network was connected at intervals to a metal conductor going all round the building and earthed in the usual way.

To test its efficacy as a protection against flying *débris*, two wooden rafters were covered over on both sides with expanded metal. The meshes were 20 mm. = 0·8 in by 50 mm. = 2 in., while the section of the metal was 3 mm. wide by 5 mm. high. A block of lead weighing 80 lb. was then dropped on to the centre of the expanded metal covering from a height of nearly 70 ft.

The rafters fully withstood the blow and only one mesh of the expanded metal was broken, the effect of the blow having been equally distributed over the whole surface, which had acted like a spring mattress.

A roof of this kind requires to be renderd rainproof by means of a galvanised or tarred sheet-iron cover and electrical connexion made between all metal parts and the wire netting. In the case of buildings where there are no heavy pieces of machinery or long lengths of shafting, the outer covering of netting was deemed sufficient as a security against lightning. The cost of a double layer is, however, of small moment if its provision offers security against inductive effects.

A building thus results which partakes of the nature of a Faraday cage, and which, while very cheap in the first cost, is proof both against lightning and against flying *débris* and at the same time machinery, shafting, etc., may be firmly fixed therein.

The floor of such buildings has been built by Mr. Guttmann over a pit in the ground, and Mr. S. Soddy has observed that earth shocks may be minimised by a similar method.

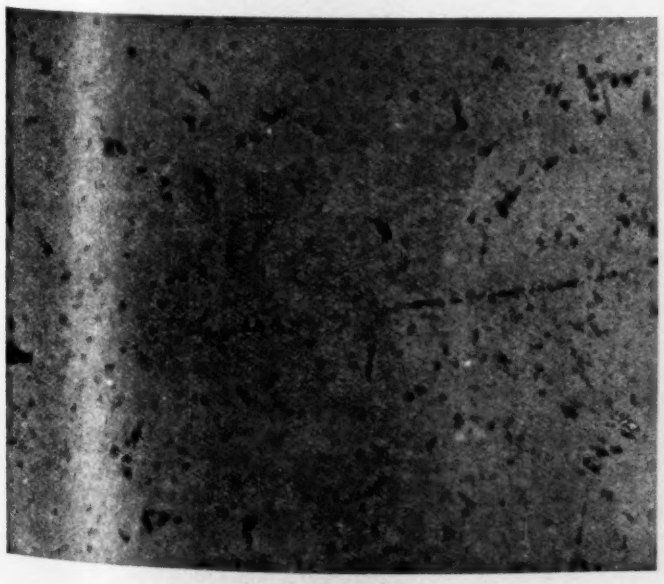
In the accompanying illustration, which represents Mr. Guttmann's design, the floor is carried above the ground a sufficient height to provide openings in the wall bases, thereby allowing air to pass freely.

In this way the layer of air no longer acts to transmit earth tremors to the building (generated by an explosion in the vicinity), but allows the concussion to be dissipated to the outer air. These openings may be spaced so as to facilitate the laying of pipes or other ducts underneath, rather than through, the building. They should be provided with detachable wire screens to keep out rubbish, and to give easy access for cleaning, etc.

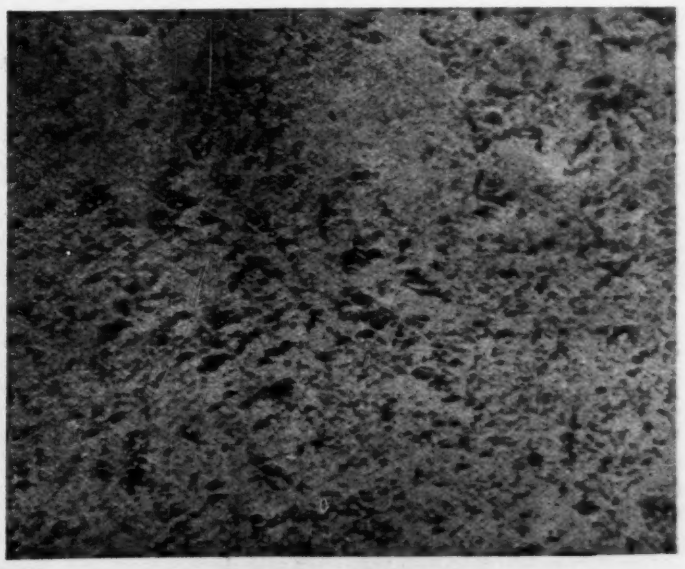
The roof principals are simply made of boarding, and not rigidly held as to outward movement. The earthplates and their electrical connexions to the roof network are shown, and also the metallic reinforcement in the surrounding concrete mounds.

SOME STUDIES OF WELDS.

UNDER this title, Messrs. E. F. Law, W. H. Merrett, and W. Pollard Digby read an interesting paper to the Iron and Steel Institute. The meaning of the term weld adopted by the authors is one covering an actual fusion together of similar or allied metals in addition to mere intimacy of contact. They urge that without such fusion there can be no weld in the real sense, and also insist that in addition to the customary tensile tests of welded joints other comparisons are necessary, such as the nature of the fracture and alterations in the character and composition of the metals due to the drastic thermal treatment, which, though not seriously affecting the strength of the weld itself, may cause increased liability to corrosion. The varieties of welds discussed in the paper include electric resistance welds, hot-flame welds with acetylene and water-gas, thermit welds, and steam-pipe flange welds by coke fire and the electric arc. The experiments described are illustrated by seventeen plates reproducing photomicrographic figures, making clear the characteristics of numerous welds examined, each having its own distinctive hall-mark. The paper shows that in every method of welding there is always a more or less clearly defined area of altered molecular construction. Just as quenching and annealing alter steel, so the local heating required for a satisfactory weld leaves its impress on the metal. Electric resistance and acetylene welds seem to be the least prone to oxidation, but good working while the metal is still plastic is of supreme importance where these types are adopted. Electric arc welds are described as most prone to oxidation, and should be employed only for positions where corrosion is not likely to occur; on the other hand, the excellent fusion obtained is a commendable feature of these welds. Flame welds, apart from work such as patching up castings, should receive adequate working while the metal is hot, and of the two methods investigated by the authors it should be noted that water-gas welds may be abnormal through the use of oxidising flames, while acetylene welds certainly require annealing to break down the crystalline structure in the vicinity of the weld. The main difficulties to be overcome in welding are too low a temperature to secure true fusion, and oxidation at the point of welding. Of these, the former is more readily detected than the latter, which is distinctly insiduous in its effects, but can be obviated in all methods of welding save that conducted by the electric arc.



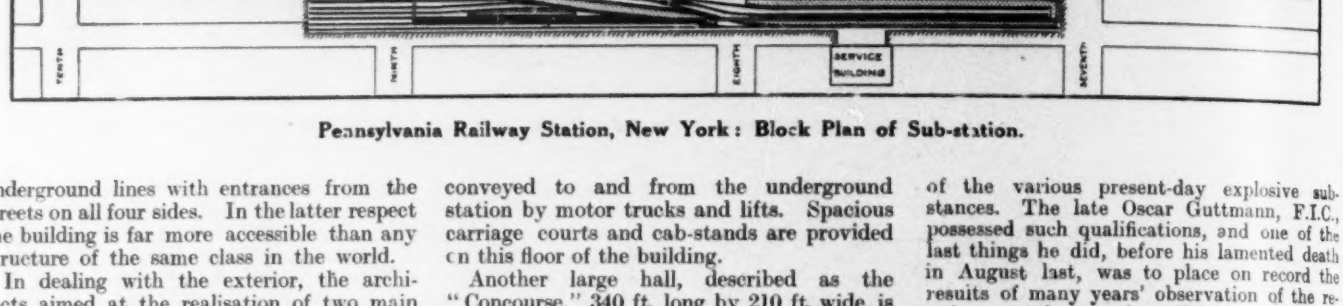
Resistance Weld. Etched.
Magnified 100 Diameters.



Acetylene Weld. Actual Weld.
Magnified 100 Diameters.

ENGINEERING NOTES.

Dust-proof Cement Bags. WE have heard a good deal about paper bags lately in connexion with culinary practice, but a more recent novelty is the use of paper-lined bags by a leading firm of cement manufacturers in Sydney, New South Wales. The expedient was due to the objection of dock labourers in the port to handle cement packed in ordinary bags on the ground that the dust emitted causes injury to health, the consequence being that cement in bags cannot be shipped in large quantities. As thousands of bags of cement



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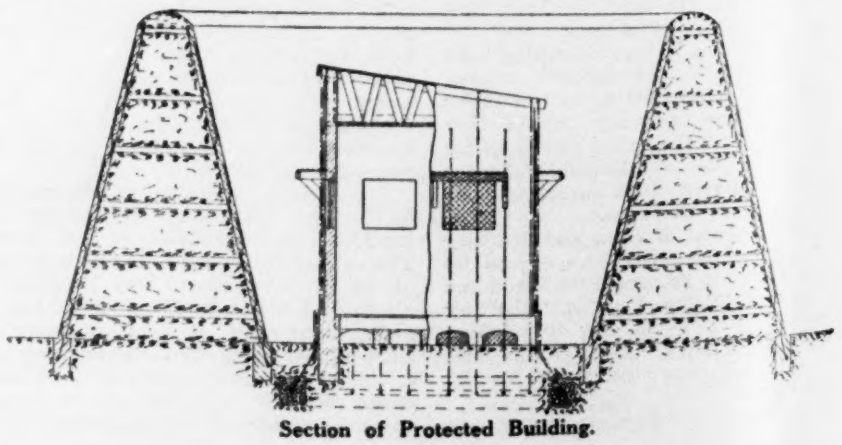


Section of Protected Building.

whilst the fourth consists of glass. In Great Britain and Austria and Hungary wooden buildings, originally with light, felt-covered roofs, and later on, chiefly in the case of magazines, with corrugated iron sides and roofs, were preferred. In Germany the buildings were still of light wooden construction, but the roof is sometimes put on quite loosely, being held by two or four wooden pins only, so that in case of an explosion the roof is simply lifted off, and the sides are supposed to remain intact, which never happened, except in black powder houses containing very small charges. In this country mounds need only exist on those sides which are within a specified distance from a building not so protected, and then they need only reach to the eaves of the building. In most other countries, the mounds must be at least 1 yd. higher than the highest point of the roof, and must surround the building on all sides, even the access to the building being formed by means of a tunnel.

It is the rule to maintain a definite distance between each building in order to minimise damage. This distance is regulated by the quantity of explosive contained in the building, but for practical purposes varies very little, 50 yds. to 52 yds. being the average for mounded buildings of high explosive works (except cartridge huts).

Mr. O. Guttmann's method is to construct the buildings of reinforced concrete made with an aggregate of fine river gravel. In order to prevent the roof being penetrated by flying *débris*, it consists of two layers of armoured concrete with a layer of sand between them. Similarly, armoured concrete is used for the surrounding mounds and for the passages leading through them to the buildings.

In a German powder-factory a trial building in accordance with these particulars was constructed, in order to prevent the transmission of fire from one portion of a packing-room to another, and the experiments made in this building were a complete success. This showed that for buildings exposed merely to fire risks the above outline of construction was quite sufficient; but, where there is risk of explosion, Mr. Guttmann finally adopted a modified form of roof.

The considerations leading to this modification were that the cohesion of armoured concrete might be so great that pieces of appreciable weight might be thrown about, and that the possibility of sand becoming admixed with explosive material in the event of an explosion was not desirable. Accordingly, in planning in 1908 and 1909 new buildings for a German factory, Mr. Guttmann discussed the subject with Privy Councillor Mente, of the Prussian Ministry of Commerce.

The walls only of the buildings were to be of ordinary concrete with river gravel aggregate, this being sufficient to protect them from flying pieces of *débris* and from the shock due to an explosion some distance away. The roof, on the other hand, in place of armoured concrete, was to be made of light, yet strong, wooden principals covered over with expanded metal, wire netting, or similar material. This network was to be provided both on the outer and inner sides of the main rafters, and since protection against lightning was thereby afforded at the same time, the network was connected at intervals to a metal conductor going all round the building and earthed in the usual way.

To test its efficacy as a protection against flying *débris*, two wooden rafters were covered over on both sides with expanded metal. The meshes were 20 mm. = 0·8 in by 50 mm. = 2 in., while the section of the metal was 3 mm. wide by 5 mm. high. A block of lead weighing 80 lb. was then dropped on to the centre of the expanded metal covering from a height of nearly 70 ft.

The rafters fully withstood the blow and only one mesh of the expanded metal was broken, the effect of the blow having been equally distributed over the whole surface, which had acted like a spring mattress.

A roof of this kind requires to be renderd rainproof by means of a galvanised or tarred sheet-iron cover and electrical connexion made between all metal parts and the wire netting. In the case of buildings where there are no heavy pieces of machinery or long lengths of shafting, the outer covering of netting was deemed sufficient as a security against lightning. The cost of a double layer is, however, of small moment if its provision offers security against inductive effects.

A building thus results which partakes of the nature of a Faraday cage, and which, while very cheap in the first cost, is proof both against lightning and against flying *débris* and at the same time machinery, shafting, etc., may be firmly fixed therein.

The floor of such buildings has been built by Mr. Guttmann over a pit in the ground, and Mr. S. Soddy has observed that earth shocks may be minimised by a similar method.

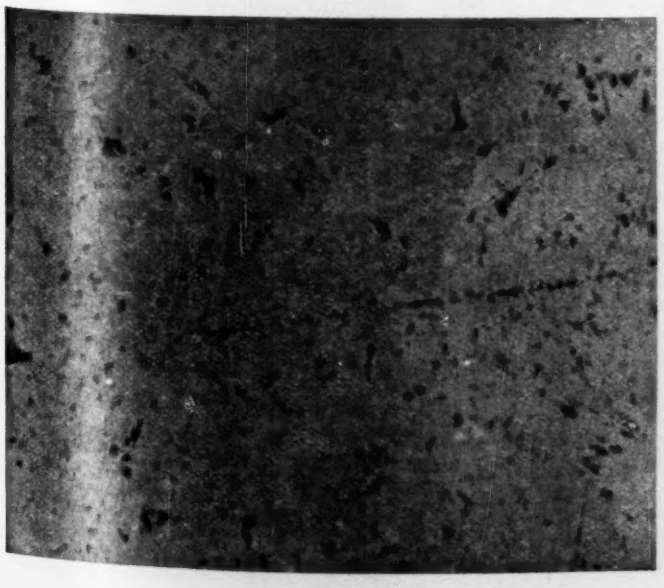
In the accompanying illustration, which represents Mr. Guttmann's design, the floor is carried above the ground a sufficient height to provide openings in the wall bases, thereby allowing air to pass freely.

In this way the layer of air no longer acts to transmit earth tremors to the building (generated by an explosion in the vicinity), but allows the concussion to be dissipated to the outer air. These openings may be spaced so as to facilitate the laying of pipes or other ducts underneath, rather than through, the building. They should be provided with detachable wire screens to keep out rubbish, and to give easy access for cleaning, etc.

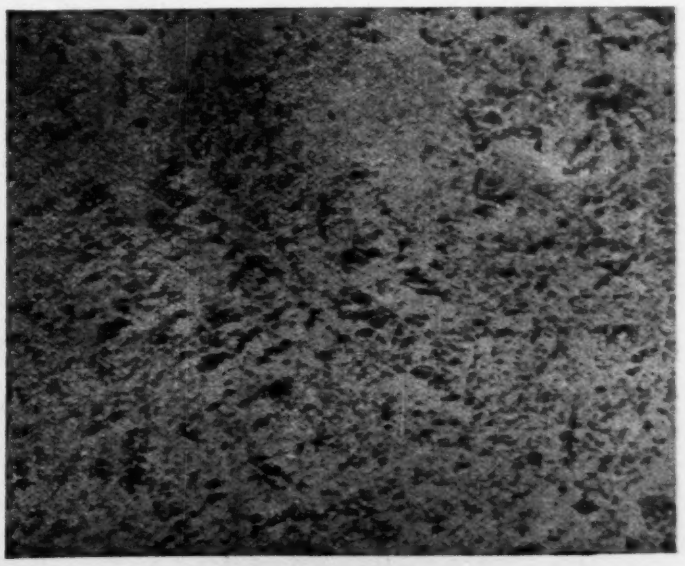
The roof principals are simply made of boarding, and not rigidly held as to outward movement. The earthplates and their electrical connexions to the roof network are shown, and also the metallic reinforcement in the surrounding concrete mounds.

SOME STUDIES OF WELDS.

UNDER this title, Messrs. E. F. Law, W. H. Merrett, and W. Pollard Digby read an interesting paper to the Iron and Steel Institute. The meaning of the term weld adopted by the authors is one covering an actual fusion together of similar or allied metals in addition to mere intimacy of contact. They urge that without such fusion there can be no weld in the real sense, and also insist that in addition to the customary tensile tests of welded joints other comparisons are necessary, such as the nature of the fracture and alterations in the character and composition of the metals due to the drastic thermal treatment, which, though not seriously affecting the strength of the weld itself, may cause increased liability to corrosion. The varieties of welds discussed in the paper include electric resistance welds, hot-flame welds with acetylene and water-gas, thermit welds, and steam-pipe flange welds by coke fire and the electric arc. The experiments described are illustrated by seventeen plates reproducing photomicrographic figures, making clear the characteristics of numerous welds examined, each having its own distinctive hall-mark. The paper shows that in every method of welding there is always a more or less clearly defined area of altered molecular construction. Just as quenching and annealing alter steel, so the local heating required for a satisfactory weld leaves its impress on the metal. Electric resistance and acetylene welds seem to be the least prone to oxidation, but good working while the metal is still plastic is of supreme importance where these types are adopted. Electric arc welds are described as most prone to oxidation, and should be employed only for positions where corrosion is not likely to occur; on the other hand, the excellent fusion obtained is a commendable feature of these welds. Flame welds, apart from work such as patching up castings, should receive adequate working while the metal is hot, and of the two methods investigated by the authors it should be noted that water-gas welds may be abnormal through the use of oxidising flames, while acetylene welds certainly require annealing to break down the crystalline structure in the vicinity of the weld. The main difficulties to be overcome in welding are too low a temperature to secure true fusion, and oxidation at the point of welding. Of these, the former is more readily detected than the latter, which is distinctly insiduous in its effects, but can be obviated in all methods of welding save that conducted by the electric arc.



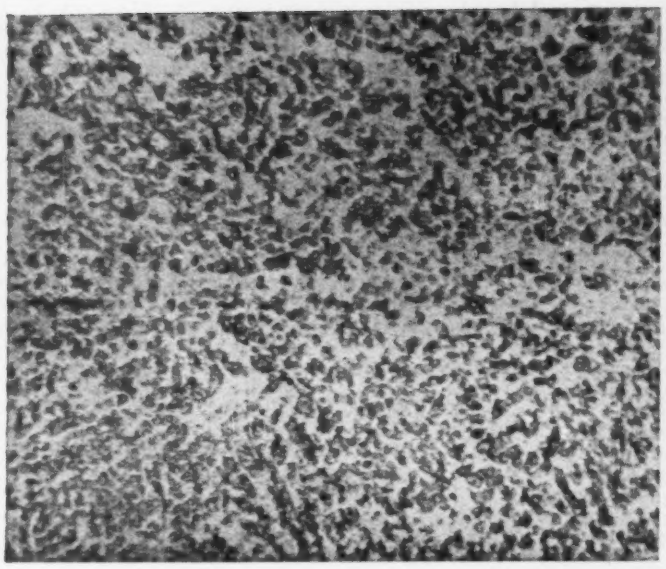
Resistance Weld. Etched.
Magnified 100 Diameters.



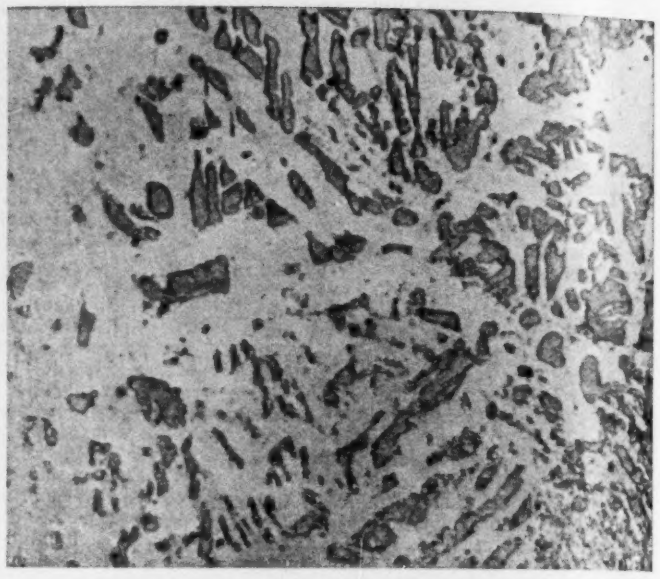
Acetylene Weld. Actual Weld.
Magnified 100 Diameters.

ENGINEERING NOTES.

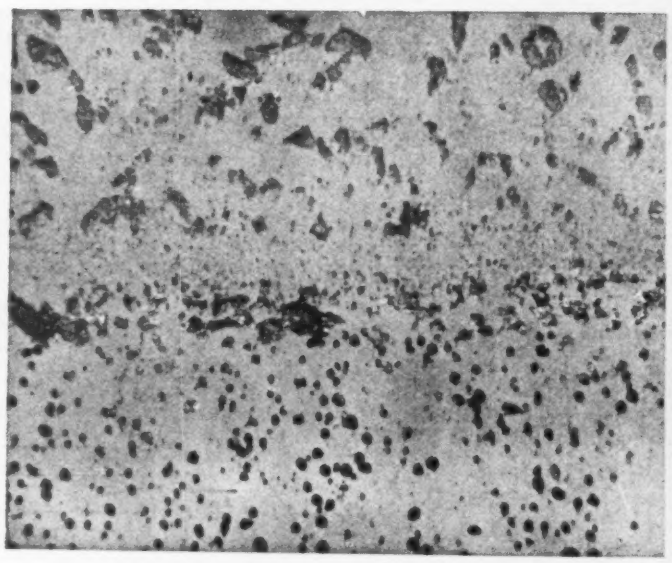
Dust-proof Cement Bags. WE have heard a good deal about paper bags lately in connexion with culinary practice, but a more recent novelty is the use of paper-lined bags by a leading firm of cement manufacturers in Sydney, New South Wales. The expedient was due to the objection of dock labourers in the port to handle cement packed in ordinary bags on the ground that the dust emitted causes injury to health, the consequence being that cement in bags cannot be shipped in large quantities. As thousands of bags of cement



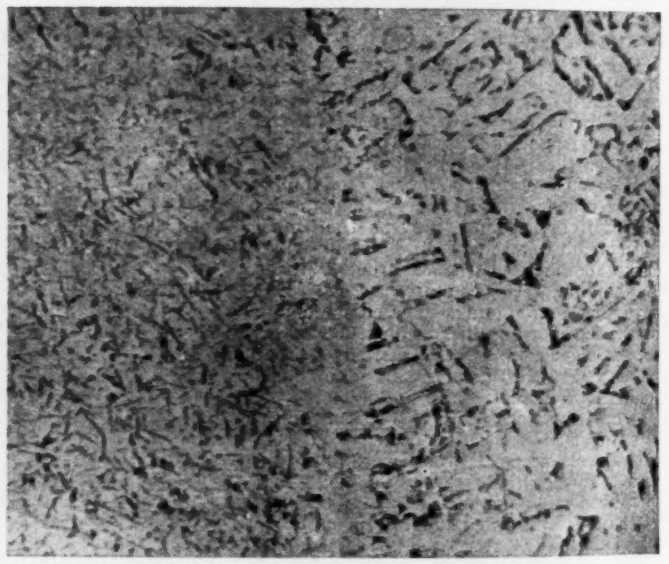
Water-gas Weld.
Magnified 100 Diameters.



Thermit Weld.
Magnified 100 Diameters.



Hand-welded Tube and Flange. Etched.
Magnified 100 Diameters.



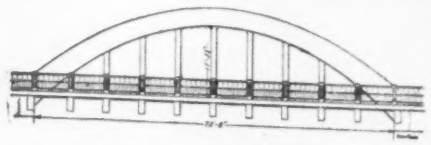
Arc Weld, showing Junction of Flange and Tube.
Magnified 100 Diameters.

("Studies of Welds," see preceding page.)

are exported monthly to Australian States by the largest manufacturers in Sydney, and the employment of barrels would be inconvenient and costly, the firm have introduced paper-lined bags experimentally. The cost of these is almost prohibitive at present, but it is believed that they can be made very cheaply in large quantities by the aid of machinery.

A Bowstring Concrete Bridge.

THE accompanying illustration represents a reinforced concrete bridge of 73 ft. span, recently built in Ohio. The design is one largely adopted in structural steel practice, but is unusual although not unknown in reinforced concrete work. Two reinforced concrete arch ribs carry

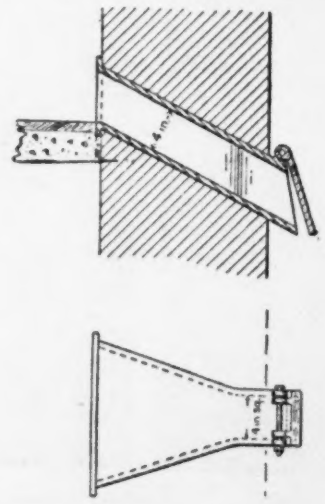


Bowstring Concrete Bridge.

the bridge decking by means of suspension members of the same material, and the arch thrust is taken by steel bars passing through the deck slab, leaving only the vertical load to be supported by the abutments. The roadway is 31 ft. wide and a 2 ft. 9½ in. footwalk projects in cantilever on each side. The cost of the work is stated at 1,720*l.*, as compared with 2,200*l.*, the lowest price submitted for a steel bridge of the same type.

Water Outlets for Fire-resisting Buildings.

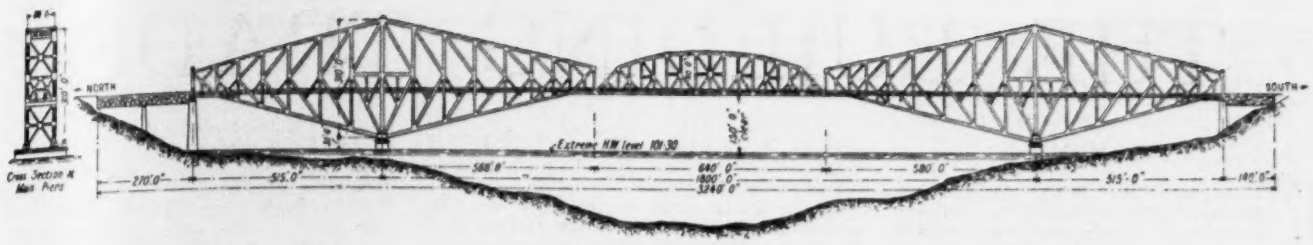
IT is a well-known fact that the damage done by water in a modern fire-resisting building is often much greater than that caused by the fire extinguished. In some cases much injury is caused by the flow of water into floors below that where an outbreak has taken place, lift wells and other openings forming ready means of communication between all the stories. In other cases damage is caused by the retention of water on fire-resisting floors where perishable goods are stored. There is no difficulty in guarding against both of these contributory causes. All floor openings can be protected by water-tight curbs a few inches high, and outlets can be inserted in the exterior walls for the escape of water. We give on this page two drawings of the water outlets provided in a New York silk warehouse for draining away water that will be used in the event of fire. It will be seen that the outer end is closed by an automatically operating door, preventing the ingress of cold air in winter, but which could easily be opened for ventilation purposes in summer if required. The idea is one that will doubtless be welcomed by many architects.



Water Outlets for Fire-resisting Buildings.

Quebec Bridge.

AFTER much discussion and the preparation of numerous designs by the Board of Engineers and competing firms the contract for the reconstruction of Quebec Bridge has been awarded to the St. Lawrence Bridge Company of Montreal. This company submitted seven different plans with tenders, and also tendered upon six alternative sets of drawings prepared by the Board. Three other firms submitted sixteen tenders between them, making a total of twenty-nine tenders, of which one only could be successful. The large amount of money sunk in the gratuitous preparation of schemes brings into relief an obvious disadvantage of the existing basis of engineering competitions, the aggregate outlay representing no inconsiderable proportion of the contract



Quebec Bridge.
(From the *Engineer*.)

price, which is nearly 1¾ millions sterling. We reproduce a general elevation of the accepted design, which provides for two railway tracks and a footpath 7 ft. wide. The length of the main span will be 1,800 ft., the same as that of the original span, and the clear headway of 150 ft. will be provided above high-water level. The work is to be completed by December 31, 1915.

River Elbe Tunnel, Hamburg.

A TWIN tunnel with the length of about 1,400 ft., and comprising two tubes of 20 ft. diameter, is at present nearing completion under the River Elbe, at Hamburg. The works were commenced in 1906, and the total cost will exceed half a million sterling. One end of the tunnel is in the suburb of St. Pauli and the other in Steinwarder, and the highway route between these places will be reduced by about two and two-third miles after the subway has been opened to traffic. Each entrance is approached by way of an imposing building covered with a large copper-sheathed dome, and containing six lifts for vehicles and pedestrians. Attendance is reduced to a minimum by the application of automatic devices for starting, accellerating, and retarding speed, and stopping the lifts.

Rust-resisting Sheet Steel.

FOR some time past makers of steel in the United States have been devoting serious attention to the production of steel less liable to corrosion than the material commonly obtainable, and which experience has shown to be far less durable than good wrought iron. One of the firms producing rust-resisting steel is the Inland Steel Company, of Chicago, by whom "non-corrosive" sheets are supplied suitable for constructing roofs, eaves, tanks, culverts, and for all purposes to which ordinary iron and steel sheets are applied. The metal is stated to be of very pure quality and free from the constituents mainly responsible for the ready corrosion of ordinary mild steel. The sheets are supplied blue annealed, annealed and galvanised, and either plain or corrugated. Architects and engineers in Great Britain would welcome steel of similar quality.

Sinking a Reinforced Concrete Pumping Well.

AN ingenious method of constructing a reinforced concrete pumping well at Haddonfield, New Jersey, consisted in sinking the cylindrical wall by excavating the earth and building up the wall as the work progressed until the required depth had been reached, when the bottom of the cylinder was closed by a concave door.

Fig. 1 is a vertical section, and Fig. 2 a half plan of the well, reproduced from an article by Mr. W. D. Vosbury in the *Engineering News*. The well is 42 ft. deep, and has the internal diameter of 20 ft., the thickness of the shell ranging from 14 in. at the top to 18 in. at the bottom. The concave floor is 16 in. thick, its form being that best calculated to withstand upward pressure.

The shell is reinforced by a network of vertical and horizontal bars; the vertical bars are arranged in two circles, composed of 1-in. and ¾-in. twisted steel, spaced 48 in. apart in the outer circle and 42 in. apart in the inner circle; and the horizontal bars are arranged in the form of concentric hoops, spaced apart at vertical distances of from 24 in. to 36 in. The bottom of the well is connected with the shell by a form of tenon joint, and reinforced by a double network of ½-in. bars forming meshes 16 in. square.

The shoe at the bottom was built of ½-in. steel plates, and to it were anchored the bars in the outer circle of the shell reinforcement. For moulding the concrete shell moulds were provided consisting of an outer and inner ring, divided into six segments and connected by bolts, the height of each ring being 5 ft. 6 in.

Before commencing construction a deposit of soft mud was cleared away from the site of the well. The shoe was then assembled and put in place, and over it were suspended the moulds, the reinforcing bars being temporarily fixed in position. Each 5-ft. course of concrete was continuously deposited, and excavation was carried on while the concrete set. By releasing the moulds the ring of concrete sank down to the bottom of the excavation, when another ring was moulded on the top, and excavation carried down for a further distance. By continuing these alternate processes the shell was finally completed to the required depth. One day and two nights were usually allowed for the concrete to set and, although no waterproofing material was employed, the well proved to be perfectly dry on completion.

The cost of the well is stated at 1,040*l*., including roof, ladder, and other auxiliaries.

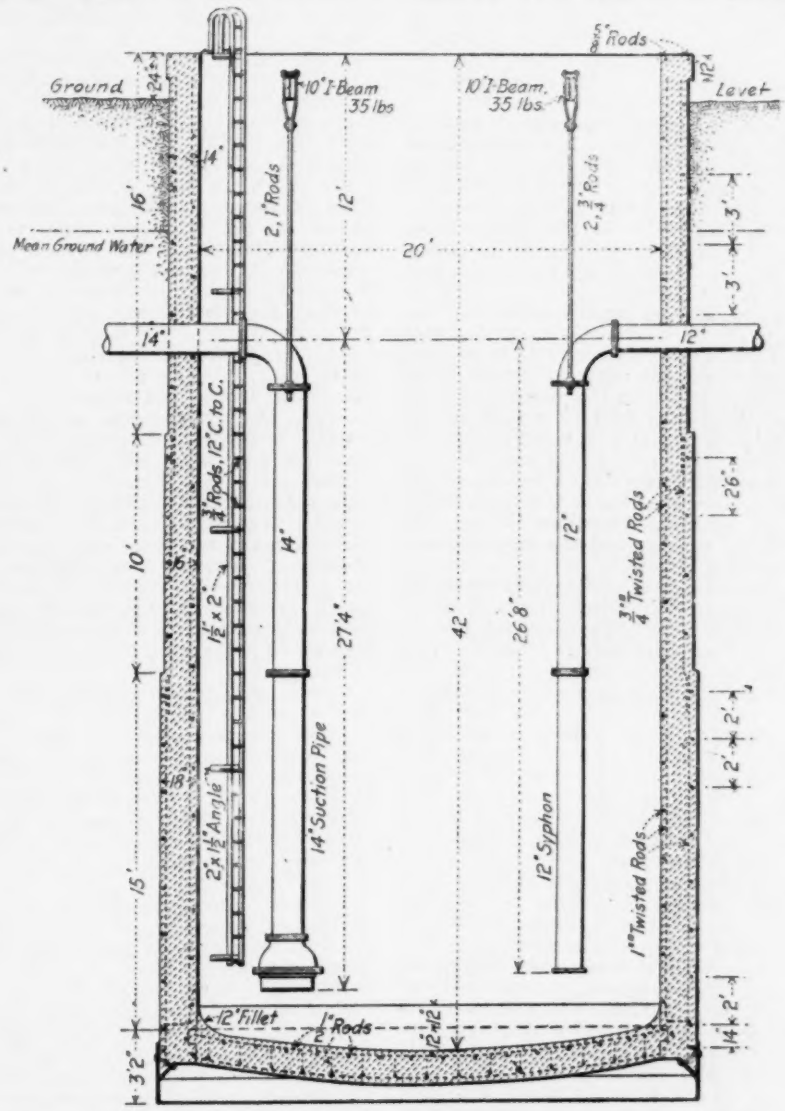


Fig. 1. Vertical Section

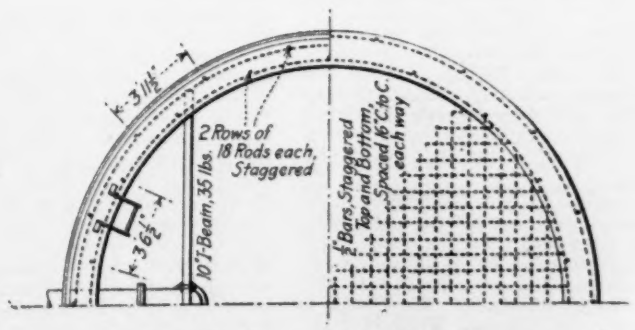


Fig. 2 Half Plan of Reinforcement

Sinking a Reinforced Concrete Pumping Well.
(From *Engineering News*.)

THE BUILDING TRADE.

STUCCO.

THE most durable stucco is obtained when cement is employed, but the trouble lies in the fact that cement sets quickly, much more quickly than lime, and cracks are liable to appear. If, however, just—with the accent on the word just—sufficient of each ingredient is used, and neither too little nor yet too much water is added, a stucco can be produced that is far superior to any other in weathering powers. If an excess of water is employed the plaster will not cling properly to the wall; yet, on the other hand, if too little be used, the cement plaster will dry so quickly that cracks are certain to result. Again, if too much cement is used cracks are liable to appear. Dryness in any form results in cracks, which in some cases are so fine as not to be discernible except by close inspection. These cracks will in time admit moisture, rain bearing sulphur and ammonia, which will in time break down the protective covering, and the stucco will fall away, either by disintegration or peeling.

One essential, therefore, to good work is that the plaster must not lose its dampness too rapidly, and this can be done by keeping the surface wetted or by way of damp cloths hung in front of the wall. It is also necessary to prevent the water in the cement being absorbed by the brickwork on which it rests, and this can be done by previously well wetting the brickwork.

To make a good weather resistant, the stucco must be dense. This can be obtained by mixing the concrete stiff, and yet contain the necessary water to prevent rapid drying, which will allow the plasterer to work rapidly. A very thorough mixing will accomplish this. Trowelling the surface should not be done too much, for although by this means density is accomplished, the result will only be the trouble of cracks when dry, which is to be avoided. Trowelling brings the water to the surface, and the work is liable to dry too rapidly.

The proportions of the various materials used is debatable. Whether the first or last coat should contain the most cement has to be considered from two points. The first coat, it is argued by some, should be the one containing the greatest percentage of cement, as it has to bind to the wall and support the outer coats. On the other hand, the last coat is the one attacked by the weather, therefore it should have the greater amount of cement is argued by others. Unfortunately, the greater the percentage of cement there is all the more tendency to crack, and unless great care is exercised a high percentage of cement is likely to produce this undesirable result. A medium percentage is therefore the best in the long run. Thus the coats—three are recommended, as two coat work is little more than ½ in. thick—may be composed of one Portland cement to two of clean, sharp sand. This for the first two coats. The finishing coat may be composed of Portland cement, sand, and clean, sharp shingle. As the cement is liable to expand during wetting and contract whilst drying the precautions previously mentioned should be taken. Lime stucco is preferred by some, because it is not liable to this trouble.

The sand and shingle must be sharp. Many a failure is due to the non-observance of this. Earthy matter or organic substances not only chemically combine with the cement and break down the stucco, but they prevent the cement from mechanically joining with the sand and shingle.

The first coat should be well scored to form a proper juncture with the second. The wall, too, should be properly prepared, well washed, and joints raked out if necessary. If the wall is old and has been exposed to the weather it should be washed down with a weak acid, as, for instance, muriatic acid. This should be done several days before the stucco is applied.

Uneven thicknesses of plastering should be avoided or cracks will result through uneven drying. Joints should therefore be filled in before the general coat is applied.

Where firring strips are used for the purpose of affixing metal mesh precautions must be taken to prevent danger from them. This arises from the fact that they are liable to split under the influence of wetting and drying at those places where staples have been driven in to fix the metal mesh, and, the mesh becoming loose, the stucco and mesh fall down. By attaching the mesh to the wood strips by galvanised-iron wire tied around both this danger is avoided.

A good lap should be given to the mesh joints, or at these places cracks in the stucco will appear. There is a danger in using metal lath where some patent plasters are used, as some of them contain acid, which attacks the metal. It is desirable, therefore, where such are used to give the mesh a coat of limewash or some similar protective coating.

Where lime is used with cement the limit should be 10 lb. of hydrated lime to one bag of cement, and this should only be used for the second coat. The first and last coats should not contain more than 5 lb. per bag of cement; in fact, it were better to use none at all in the finishing coat. Only hydrated lime should be used, and no plasterer's putty. Hydrated lime is lime scientifically prepared, being properly cleansed and screened, and is free from all impurities. A good substitute for sand used by the Americans is asbestos rock and fibre. The fibre performs the binding function of ox-hair in plastering, the stucco being less liable to crack. The use of asbestos fibre along with cement and sand can be recommended. Other aggregates, such as crushed marble, finely-crushed granite, and similar rocks are used where some special finish is desired.

To obtain a rough-cast finish, mix one part hydrated lime with two of Portland cement, mixed dry, and add water until a thick paste is obtained. Put this into a pail, and, keeping it well mixed, take out by means of a paddle or trowel, which, dashed against a stick held in the other hand, splashes the mixture on to the wall, giving the rough-cast finish.

Pebble dashing is composed of clean-washed pebbles mixed with a thick paste of the composition above. This gives a pebbly surface to the work. To obliterate any streaks showing after the finishing coat has been put on, a lime-cement wash can be used, which at the same time will fill in any cracks. To obtain a float finish, the surface is treated with a hand float in the ordinary way for plastering.

"Depeter" is a rough-cast into which pebbles or broken stones are pressed after the last coat has been floated and whilst it is still wet.

If tinting is to be done the colouring matter can be added to the cement-wash just mentioned, but the result is not so lasting as pigments mixed along with the stucco. Free lime in the concrete when moist chemically combines with many of the ordinary colour pigments, and also attacks any organic matter in the plaster. The use of paint, therefore, containing linseed oil should be avoided. The percentage of colouring matter to be added to the plaster depends upon the tint required. This may be a source of danger, because a high percentage of some pigments weakens the plaster. Yellow ochre can be added up to 8 per cent., and gives a bright tan colour. Yellowish brown or buff can be obtained from 5 per cent. yellow ochre and 2½ per cent. of permanganate brown. Black shades are obtained by using a small percentage of lamp-black or carbon. For red, red oxide or iron are the only colours that can be safely employed. A strong, highly-priced oxide, whereby a small percentage only is necessary, is better than a weaker, cheaper grade. Black iron oxide will give a bluish shade of black. Brown is a colour not readily obtainable except at the expense of the plaster's strength.

Iron oxide can be used; the lime in the concrete acts on ferric chloride or ferric sulphate, giving a reddish-brown colour—a deposit of ferric hydroxide; but to obtain this 20 to 30 per cent. by weight of colouring matter is required. Green is another colour difficult to obtain. The only green pigment that will stand the lime action is chromium oxide, which is an expensive mineral pigment. The colouring values of the cheaper grades are very low. By mixing blue and yellow green can be produced, but the trouble is to obtain a good strong blue that will withstand the lime. A good blue is ultramarine blue, but it has a very poor colouring power when mixed with other pigments. It will, however, stand the action of the lime.

The alternative is to use a light-coloured plaster, but this means a more expensive stucco. Olive green can be obtained by using yellow ochre and a pigment of bluish tendency, as some of the blacks, but the brown, sandy shade of the concrete has yet to be overcome before a good green can be obtained. The alternative is painting the surface.

SOME LEGAL QUESTIONS ABOUT EXTRAS:

THE ARCHITECT AS ARBITRATOR.

WE have received the following communication from a well-known builder:—

"I am thoroughly in agreement with the remarks of Mr. J. E. Yerbury in your last issue as to the necessity for a revised form of contract. But whatever care may be taken in framing a revised form, I imagine that the legal profession will, until the end of time, persist in acting on the principle that law and justice are not necessarily synonymous. A lifelong experience in the building trade has brought this hard fact home to me on many occasions. More than once the R.I.B.A. form has been submitted, in my presence, to a barrister who had had no previous knowledge of the document, and after perusing it, he has asked me, with an air of questioning surprise, "And have you really signed this? Why you are entirely in the hands of the architect." Of course, some will say that it speaks volumes for the general integrity of the profession that there are comparatively few cases figuring in the courts. On the other hand, it must not be forgotten that, in by far the greater number of cases where builders consider they have a real grievance, considerations of expense or other equally cogent reasons may determine them to submit to what they deem injustice with what grace they may.

I am inclined to agree that the arbitrator should, by preference, be a lawyer, although the idea seemed a startling one at first. It is no slander to say that the architect, as arbitrator in his own case, is in an impossible position if an unbiassed, impartial decision is the desideratum. It is against human nature.

I have in my mind an architect for whom I have worked for at least a score of years, and with whom I have settled up as many jobs, always in a friendly manner, yet to me it is only too obvious when he has a client difficult to satisfy, or when his own plans or specifications chance to be a little bit faulty—as must happen sometimes to the most painstaking architect. In such circumstances he appears a different man altogether, and falls back upon his powers under the contract in a manner that, although entirely unconscious to himself, is patent to a student of human nature like myself. I very much doubt whether the strong and just architect alluded to by Mr. Yerbury really exists. Certainly, some of the architects of highest reputation in the profession fail to reach my ideal in these respects. Quite possibly here-in I show my own bias. I am quite certain, however, that men at the top of the profession are not disinclined to shield their own reputation behind the broad back of the builder. The maintenance clauses, sometimes enforcing the remedying of defects over a period of one or, as in one case I know of, two years, and the withholding of the retention money,

are powerful weapons when the architect has a mind to do this. Twelve months bring to light many defects, not all of them due to bad material or faulty workmanship. I have had to replaster ceilings whose cracks were indubitably owing to ignoring the formulæ laid down as to the proportion the depths of joists and beams should bear to their span; to make good settlements undoubtedly caused by skimping the foundations in unsatisfactory soil; to renew casements badly designed for the purpose of keeping out wet; and so on. The unacknowledged but fully-understood penalty for neglecting to do so being the loss of the architect's favour and opportunities of tendering for his work. My advice was asked a short time ago with reference to a case in which the architect deliberately rejected tiles submitted by the builder, and ordered him to obtain tiles from a certain yard. These tiles went wrong, and after two years, the retention money having been withheld, the builder was ordered to strip the roof and retile with other tiles. To my mind, this architect's notion of fairness is embryonic, his idea of justice elemental. Yet he and the others are all of them, like Brutus, "honourable men." One can only echo Burns's cry, "O wad the Powers the giftie gi'e us, to see oursel's as others see us." There would be objection, of course, to the subsitution of a lawyer for an architect as arbitrator on the ground of lack of technical knowledge, but, I imagine, if lawyers were appointed as a regular thing, some of them would soon specialise in this particular direction.

I do not understand Mr. Yerbury's assertion in relation to extras, that the builder charges as much as he can. How can this be when the contract specially provides that these are to be measured and valued at contract rates? On the contrary, the standing grievance is that it is impossible to carry out the bulk of the extra works without incurring a serious loss. An additional door or window is ordered, and, notwithstanding the well-known fact that a single door or window will cost from 25 per cent. to 50 per cent. more than the same articles when made in quantities, the surveyor usually insists upon pricing at the contract rate for the larger quantities, and prates about the law of average. Times without number I have had to accept 1s. 6d. for an odd window which the shop-books show to have cost 2s., and so with other things: a little bit of garden wall, or a little bit of gas-pipe, ordered after the bricklayer or the gas-fitter have left the job, is supposed to be carried out at the same price as the bulk of the work, although men and tackle have to be brought back to the job on purpose to do these little joblets. Extras of this kind are a curse, and ruin many an otherwise profitable job. The ideal contract under the present system is undoubtedly that in which the plans and details, in a complete state, are handed to the contractor upon signing, and no deviations or extras occur. Architects never give consideration to the fact that variations almost inevitably mean delay, delay means disorganisation, disorganisation means loss. Six months in a builder's office as correspondence clerk would bring this home to them as nothing else could."

GOVERNMENT CONTRACTS.

THE following tenders have been accepted during the past month by the Government Departments named:—*Admiralty, Works Department:* Granite pitchers—Messrs. A. & F. Manuelle, 57, Gracechurch-street, E.C.; heating of detention quarters, Devonport—Messrs. Dean & Beale, Ltd., 1, Arthur-street, East, E.C. *Admiralty, Contract Department:* Fire-bricks—Messrs. Bonnybridge, Silica, & Fireclay Company, Ltd., Bonnybridge, Stirlingshire; Messrs. Candy & Co., Ltd., Heathfield Station, near Newton Abbot; Messrs. Martin Brothers, Ltd., 29, Lockyer-street, Plymouth; Messrs. Priestman Collieries, Ltd., Milburn-house, Newcastle-on-Tyne; Messrs. Westlake & Co., Calstock, Cornwall. *War Office:* Works services, erection of married soldiers' quarters, Royal Military College, Sandhurst—Messrs. T. Turner and G. Kersley, Frogmore, Blackwater, Hants; erection of barrack blocks, Dover—Messrs. G. Lewis & Sons, Widred-road, Dover; erection of forage barn, etc., Barry, Forfar—Mr. J. Raitt, 9, George-street, Montrose, N.B.; excavation work at Woolwich Dockyard—Messrs. F. & T. Thorne, Isle of Dogs, E.; periodical services, Fermoy and London (Wellington Barracks)—Mr. F. Holdsworth, 32, Saltaire-road, Shipley, Yorks; Tipperary—Mr. T. Kellcher, 4, Millard-street, Cork; Woolwich—Mr. F. Holdsworth, 32, Saltaire-road, Shipley, Yorks; renewing flooring, Aldershot—Mr. Jas. Crockerell, Stanhope Lines, Aldershot; structural steel and iron for coal bunkers, Woolwich—Widnes Foundry Company, Ltd., Widnes. *Crown Agents for the Colonies:* Cement—Messrs. Peters Bros., 72, Victoria-street, S.W.; Messrs. Martin Earle & Co., 139, Queen Victoria-street, E.C. *Office of Works:* Builders' work, Blackburn, alterations and additions to County Court—Messrs. W. J. Woof Cronshaw & Sons, Pump-street, Blackburn; British Museum, reconstruction of roof—Messrs. W. E. Blake, Ltd., Plymouth; Carnforth, new post office—Messrs. R. Thompson & Morris, 12, Dalton-square, Manchester; Croydon, enlargement of telephone exchange—Messrs. J. & M. Patrick, Wandsworth, S.W.; Devonport, extension of post office—Mr. A. N. Coles, Old Town-street, Plymouth; Edinburgh, new workshops at Brighton-street—Messrs. J. Scott & Brown, 3, Barclay-place, Edinburgh; Eltham, new post office—Messrs. Thomas & Edge, Woolwich, S.E.; Glasgow, temporary accommodation at head post office—Messrs. William McCall & Sons, 5, Balmano-street, Glasgow; Hull, adaptation of labour exchange—Mr. P. T. Kettlewell, 60, Trinity-street, Hull; Kidderminster, enlargement of post office—Mr. E. Crowdon, Farm-street, Birmingham; Maybole, new post office—Messrs. D. & J. Milligan, 46, Kyle-street, Ayr; Newcastle-on-Tyne, new branch post office at Heaton—Mr. J. Milne, Coatsworth-road, Gateshead; Romford, new post office—Mr. F. Wilmott, 36, High-road, Ilford; western telephone exchange erection—Messrs. Howell J. Williams, Ltd., 11-17, Bermondsey-street, S.E.; Woking, alterations to post office—Mr. McCarthy E. Fitt, 118, Oxford-road, Reading; pavement and vertical lights, British Museum extension—Messrs. Thaddeus Hyatt & Co., 9, Farringdon-road, E.C. *Commissioners of Woods:* Pair of stone cottages at Ford, Inverleiver, Co. Argyll—Mr. J. Carmichael, Kilmichael, Glassary, Lockgilphead, N.B. *Commissioners of Public Works, Ireland:* Erecting and furnishing Malinmore National School—Mr. R. Colhoun 22, Strand-road, Londonderry.

GENERAL BUILDING NEWS.

NEW FREE CHURCH, FRINTON-ON-SEA.

The plans of this church have been prepared by Mr. W. Hayne, J.P., architect, of Frinton-on-Sea, and the builders are Messrs. Potter & Sons, of Chelmsford. The contract price is 3,332*l.*

NEW SCHOOL, EDINBURGH.

A new higher grade school is to be erected on a site at Viewforth, at a cost of 54,000*l.*, to provide accommodation for 1,200 pupils. The architect for the work is Mr. John A. Carfrae, of Queen-street, Edinburgh.

REMODELLED SCHOOL, MACDUFF.

The alterations to this school have been carried out under the direction of Messrs. Sutherland & George, architects, of Aberdeen. The various contractors were:—Mason work—Mr. J. G. Corbett, Fraserburgh; carpenter work—Mr. J. Watt, jun., Inverurie; slater work—Mr. Forbes Morrison, jun., Aberdeen; plaster work—Messrs. Roger & Baxter, Aberdeen; plumber work—Mr. J. Connell, Macduff; painter work—Messrs. Gordon & Watt, Aberdeen; heating—Messrs. J. Blaikie & Sons, Aberdeen; block flooring—The Acme Block Flooring Company, London.

NEW BANK, ASHTON-UNDER-LYNE.

The new buildings of the Ashton Savings Bank have been erected from designs—selected in competition—prepared by Messrs. W. H. George & Sons, architects, of Ashton. The cost of the erection was 3,800*l.*, and the builders were Messrs. Saxon Bros., of Stalybridge.

NEW WORKHOUSE INFIRMARY, READING.

These buildings, which were opened last Saturday by Mr. John Burns, have been erected at a cost of 13,738*l.*, from the designs of Mr. W. Roland Howell, F.R.I.B.A., architect, of London and Reading, and the various contractors were:—Messrs. H. W. Godwin & Co., Church-street, Reading, additions to nurses' home. Mr. McCarthy E. Fitt, Oxford-road, Reading, the committee-room block, the aged and infirm block, and the mortuary. Mr. Francis Newberry, King's-road, Reading, the additions to the porter's lodge and the building of the operating department. The sub-contractors included the Kleine Patent Fire-Resisting Syndicate, Ltd., of 133, High Holborn, W.C., who laid the floors and roof of the aged and infirm block and the roof of the operating department; Messrs. Val de Travers, of Bishopsgate-street, E.C., who laid the asphalt on roofs; Messrs. Vulcanite, Ltd., of 115, Cannon-street, E.C., who executed portions of the roofs of the nurses' home, committee-room block and porter's lodge; Messrs. Dnespeker, Ltd., of Holborn Viaduct, E.C., who laid all the Terrazzo flooring; Messrs. Bain & Co., of 22, Cannon-street, E.C., who erected the outside iron staircase; Messrs. A. Brown & Co., of 81, Smallbrook-street, Birmingham, who supplied the door and window fittings; Messrs. Baughan, of London-street, Reading, who installed the electric light in the operating-room block and the bells and telephones in the block for the aged and infirm; Messrs. Dennison, Kett, & Co., of 11, Queen Victoria-street, E.C., who supplied the lift in the same block.

BANK, NEWCASTLE-ON-TYNE.

Considerable extensions and alterations have been made to the Lambton branch, Grey-street, of Lloyds Bank, Ltd. Adjoining premises were obtained, which were rebuilt, the basement and ground floor added to the bank, and the upper floors are offices. The bank is fitted up in mahogany, the floor of public space is vitreous and ceramic mosaic, and behind counter in oak. The floor of managers' and consulting rooms is finished with parquetry. The general contractors were S. F. Davidson & Miller; mosaic by Emley & Sons, Ltd.; fireplaces by Henry Walker & Son, Ltd., and Emley; plastering by Davidson & Miller and John Chapman; electric installation by S. Gillitt; locks and hardware by N. F. Ramsey & Co.; painting and decoration by John G. Cole and Davidson & Miller; heating by The R. J. Ward Company (all of Newcastle); stanchions, columns, and girders by Dorman, Long, & Co., Ltd., Middlesbrough; fireproof floors by The Fawcett Construction Company, Ltd., Greenwich; wood block floors and parquetry by The Art Pavements and Decorations, Ltd., London; sanitary fittings by Doulton & Co., Ltd., London; electric passenger lifts by Waygood & Co., Ltd., London, and Pickerings, Ltd., Stockton-on-Tees; and a specially built basement lift by Pickerings; electric fittings by Best & Lloyd, Birmingham, and Veritys, Ltd., Manchester; entrance doors by The Van Kannel Revolving Door Company, Ltd., London. New fittings, counters, desks, etc., which are in mahogany, were made by Robson & Sons, Ltd., Newcastle. The whole of the work was designed by and carried out under the personal direction of Mr. John W. Dyson, architect, Newcastle, and Mr. C. H. Davies was clerk of works.

DRURY-LANE THEATRE.

Considerable structural alterations and decorative works are in progress at Drury-lane Theatre, which reaches its centenary next year. The vestibule is being entirely remodelled in connexion with the reconstruction work. The ceiling has been panelled, and enriched beams added with a modillion cornice to the walls. The walls have been treated with a 6 ft. high dado in polished mahogany, running all round the vestibule, and in place of the old solid doors leading to the rotunda and staircases French doors in mahogany have been put with bevelled plate-glass panels. The existing lobby doors have also been brought into harmony with the new scheme of decoration. The large saloon over the vestibule is also in the hands of the decorators, and considerable additions are being made to it. The main staircase ceilings needing reconstruction, an opportunity has been taken to put in a modelled ceiling with new lantern lights over each staircase. The architects are Messrs. Pilditch.

NEW BUILDINGS IN LONDON.

Rebuilding premises, Poppin's-court, E.C.; Messrs. Dove Bros., builders, Islington. Shops, etc., Great Portland-street and Great Castle-street, W.; Mr. W. E. Blake, builder, Montague-place, W.C. Shops, showrooms, etc., Princes-street, W.; Messrs. T. H. Kingerlee & Sons, builders, Oxford. Rebuilding premises, Oxford-circus, W., for Madame Louise, draper, etc.

HER MAJESTY'S OPERA HOUSE, WINTER GARDENS, BLACKPOOL.

The Opera House and Grand Foyer, Blackpool, has just been opened. No additional land was taken in for the new building, but the avilable space has been so utilised as to provide seating accommodation for 2,300 people, as compared with 1,500 in the old building. The style adopted is Louis XIV., and the façade is of Marmo, relieved with ornamental railings along the balcony. The main entrance in Church-street may be described as a marble hall, for there is a white marble staircase leading up to the royal circle and foyer; the floor is of black and white marble laid in chess-board fashion, and round the walls there is a dado of Brêche Violette marble. The fibrous plaster work in front of the private boxes and royal circle is taken from a model of an ancient château in France. The orchestra stalls consist of inlaid mahogany

Sheraton chairs, a special feature being upper and lower shelf fitted at back of each chair for opera glasses, gloves, hats, or other small articles. The royal circle, the circle, and the pit stalls are equipped with tip-up chairs. In no seat of the theatre is there any obstruction of view, and with nine exits on the ground floor, three in royal circle and gallery, the theatre can be emptied in a comparatively short space of time. The whole of the building and the various tiers are of the latest fireproof construction. The grand foyer is a large hall for use in connexion with the dress circle, with a balcony for use in connexion with the upper circle, and is based on the lines of the foyer of the Paris Opera House. The grand foyer is situated over the main entrance, and is approached from the royal circle level by a white marble staircase. The balustrade in the entrance to the foyer is of white marble. The decoration of the grand foyer has been carried out in the same style as the theatre, except that the colours differ. There are sixteen Corinthian columns of Sienna marble with gilt caps, against the cream and gold tones of the plaster enrichment on the walls, and above there are four classic pictures on the ceiling, the whole being surmounted by a coffered dome ceiling relieved with gold. The plans and designs of the present theatre were prepared by Messrs. Mangnall & Littlewood, of Manchester, and the work has been carried out by the following firms:—General contractors — Messrs. Parkinson & Sons, Blackpool; front elevation —Messrs. The Leeds Fireclay Company, Ltd., Leeds; steel work—Messrs. Samuel Butler & Co., Stanningley, Leeds; heating and ventilation—Messrs. Saunders & Taylor, Manchester; fibrous plaster decorations, carpeting and seating, draperies and curtains—Messrs. Waring & Gillow, London; marble work — Messrs. Anthony Bell & Sons, Lancaster; ornamental ironwork—Messrs. Cunliffe & Dean, Manchester; lead lights—Mr. Walter J. Pearce, Manchester; tile work—Mr. A. Ollivant, Shelton, Stoke-on-Trent; electrical fittings—Messrs. Edison & Swan, Liverpool; electrical installation—Messrs. The Blackpool Winter Gardens Company.

NEW LIBRARY, INVERURIE.

This Carnegie library has been erected at a cost of 1,500*l.* from the plans prepared by Mr. Harbourne Maclennan, of Messrs. Jenkins & Marr, architects, of Aberdeen. The contractors for the work were:—Mason—Mr. John Smith, Kintore; carpenters—Messrs. Edward & Rae, Dyce; slater—Mr. Forbes Morrison, Aberdeen; plumbers—Messrs. James Laing & Sons, Inverurie; plasterers—Messrs. Grant & Robertson, Inverurie; asphalt work—Messrs. Bradshaw & Co., Glasgow; painter and glazier work—Messrs. J. W. Forrest & Co., Aberdeen; steel and iron work—Messrs. James Abernethy & Co., Aberdeen.

TRADE NEWS.

Messrs. Trollope & Colls, of London, have added an engineering department to the firm for the design and construction of structures in reinforced concrete or steel work. The offices of this department are at 5, Coleman-street, E.C.

The Woodford Church, Cheshire, is being ventilated by means of Shorland's patent concealed extract ventilators and inlet ventilators, supplied by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

Under the direction of the Norfolk Education Committee, Boyle's latest patent "air-pump" ventilators have been applied to North Lopham Schools.

Messrs. Patman & Fotheringham, Ltd., 100 and 102, Theobald's-road, London, W.C., have secured two contracts for works in alterations and additions at both His Majesty's Theatre, Haymarket, W., and the Savoy Theatre, Strand, W.C.

Under the direction of Messrs. Baker & Wrightson, architects, Clacton-on-Sea, Boyle's latest patent "air-pump" ventilators have been applied to St. Paul's Church, Clacton-on-Sea.

The Brightside Foundry and Engineering Company, Ltd., of Sheffield, London, and Birmingham, have secured the contract for the heating and ventilating installation at the British Museum extensions (King Edward VII. Galleries). The buildings are being erected to the designs of Mr. John James Burnet, A.R.S.A., F.R.I.B.A., of Glasgow.

The new Council school at Long Ditton-hill, Surbiton, has recently been fitted with D. O. Boyd's Hygiastic ventilating school grate, supplied by Messrs. O'Brien, Thomas, & Co., Upper Thames-street, London, E.C., and Excelsior Works, South Bermondsey.

Samples of Belgian bricks are now on view at Gidea Park, where particulars may be obtained. The Bruges pattern is the make mostly used for new work and restorations, and the price, delivered at the Squirrel's Heath sidings, before the strike, worked out at about 20s. per ton, or 26s. per 1,000. Prices may now, however, be slightly raised, owing to the strike.

The new Council schools, Swindon, have been supplied with Shorland's warm air ventilating Manchester grates by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

A new warehouse is being erected at Uxbridge for the Metropolitan Railway Company, the architect being Mr. W. L. Eves, of Uxbridge, and Messrs. Fasenidge & Son, of Uxbridge, the contractors. Two new warehouse lifts are being installed by the Lift and Hoist Company, of Deptford, who have also just completed two lifts for the new station at Hitchin for the Great Northern Railway Company.

The Café Monico is being altered under the direction of Messrs. Kemp & How, architects, FF.R.I.B.A., 4, Bloomsbury-square. The two new lifts, iron staircases, and lantern lights are being executed by the Lift and Hoist Company, Premier Engineering Works, Deptford, S.E.

PROJECTED NEW BUILDINGS IN THE PROVINCES.*

ABERDEEN.—Extensions to King's College; the Managers.

Aberystwith.—Museum (31,000*l.*); Messrs. E. Turner & Sons, builders, Penarth-road, Grangetown, Cardiff.

Ashford.—Technical instruction buildings; Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W.

Ayr.—Additions to school, Green-street-lane (450*l.*); School Board, Ayr. Re-erection of farm buildings, Cunning Park (1,200*l.*); the Managers.

Barnsley.—Proposed baths (7,500*l.*); Mr. J. Henry Taylor, Surveyor, Barnsley Town Council.

Bexley.—Extensions, Welling Council School (250 places); Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W.

Blackpool.—Workshop and meter testing shop, Hull-street (2,500*l.*); Fylde Water Board.

Bognor.—Workmen's dwellings (3,500*l.*); Mr. O. A. Bridges, Surveyor, Bognor Urban District Council.

Bridlington.—Laundry at workhouse (900*l.*); Mr. G. Hankinson, Clerk, Board of Guardians, Bridlington.

Brookland.—Proposed school (100 places); Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W.

Cambridge.—Alterations, Railway Hotel; the Proprietors. Servants' wing, Christ's College, Hobson-street; the Governors.

Carnoustie.—Abattoir 400*l.*); Messrs. D. Anderson & Son, builders, Dundee.

Carronshore. — Proposed school (5,000*l.*); Larbert School Board.

Chelmsford. — Extensions, public library (800*l.*); Mr. C. Brown, Surveyor, Chelmsford Town Council.

Clowne.—Four houses, Spring-hill, Whitwell, for the Worksop Co-operative Society.

Dukinfield. — Proposed town hall; Mr. Samuel Hague, Surveyor, Dukinfield Town Council.

Dundee.—College (60,000*l.*); Mr. T. Martin Cappon, architect, 32, Bank-street, Dundee.

Eastwood (Notts).—Proposed swimming bath; Mr. A. G. Wheeler, Surveyor, Eastwood Urban District Council.

Edenbridge.—Special subject building; Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W. Alterations to school, Haxted-road (550*l.*); Mr. E. Leigh, builder, Westhill, Edenbridge.

Elham.—Hospital (3,560*l.*); Mr. R. Lonergan, Clerk, Board of Guardians, Folkestone.

Ferryhill.—Four houses for the Coxhoe Co-operative Stores.

Garstang.—Proposed new public offices; Mr C. Thornton, Clerk, Garstang Board of Guardians

Gillingham. — Royal Naval and Marine Orphanage, Oxford-road; the Managers.

Glasgow.—Houses, Gallowgate and Graham-square; Mr. Thomas Aitken, 447, Gallowgate, Glasgow.

Halstead.—Swimming bath; Mr. W. A. Nicholson, Surveyor, Halstead Urban District Council.

Hollingworth.—Fire brigade house, Arrowsmith Mill, for the Calico Printers' Association.

Horsell.—Sixty-eight villas and branch store (20,000*l.*); Woking Co-operative Society.

Huthwaite.—Free library, Sutton-road; Mr. G. Bostock, Surveyor, Huthwaite Town Council.

Johnstone. — Proposed slaughter house (2,000*l.*); Messrs. Kerr & Watson, architects, Houston-square, Johnstone.

Kirkby Laythorpe.—Restoration of parish church (600*l.*); Messrs. Bowman & Sons, builders, Cherry Holt-lane, Stamford.

Langholm.—Additions to woollen mills for Messrs. McIntyre, Cairne, & Co.

Lowestoft.—Smith and wheelwrights' shops; Mr. G. H. Hamby, Surveyor, Lowestoft Town Council. The following plans have been passed: — Alterations, 21, Marine-parade; Mr. J. T. Woolnough. Alterations to Belvedere Hotel, Belvedere-road; Messrs. Youngman, Prestman, & Co. Four houses, Worthing-road; Mrs. Warden. Six houses, London-road South: Mr. R. C. Todd.

Methil.—School, Bayview Park (10,000*l.*); Mr. G. C. Campbell, architect, Methil.

Milnrow.—Extensions to premises, Two Bridges-lane, for the Newhey Cotton Spinning Company. School, Crossley-street; Dr. H. L. Snape, Secretary, Education Committee, Lancaster County Council.

Newcastle-on-Tyne.—Alterations of offices of *Newcastle Chronicle;* the Proprietors.

Peterhead.—Houses, etc., Constitution-street; Mr. James Dickie, Surveyor, Peterhead Town Council.

Radcliffe. — Rebuilding technical school (9,200*l.*); Mr. John Allen, builder, Railway-street, Radcliffe.

Rainsford.—Proposed workmen's dwellings; Mr. C. Brown, Surveyor, Chelmsford Town Council.

St. Dennis (Cornwall).—Liberal club-rooms (300*l.*); the Secretary.

Sale.—Public baths (6,700*l.*); Mr. William Holt, Surveyor, Holt Urban District Council.

Saltash.—Alterations, St. Barnabas Hospital; the Governors.

Selby.—Eight cottages; Messrs. Lister Brooke & Co., builders, Brighouse.

Stalybridge.—Improvements to St. Paul's Church, Staley (700*l.*); the Trustees.

Stannington.—Asylum (76,600*l.*); Messrs. W. Moss & Sons, builders, Baxter Gate, Loughborough.

Stepps.—Enlargement, parish church; the Trustees.

Surbiton.—Extension to Council's offices; Messrs. Forsyth & Maule, architects, care of the Clerk to the Council.

Sutton-at-Hone (Kent). — Enlargement of Hextable School; the Managers.

Tynemouth.—Extensions, Tynemouth Infirmary (600*l.*); the Managers.

Viewforth.—School (54,000*l.*); Edinburgh School Board.

Wednesbury.—Alterations, Coach and Horse Inn; the Managers.

Wigton.—Additions and alterations, clothing factory, Station-road, for Messrs. S. Redmayne & Sons.

Willesborough (Kent).—Proposed extensions to schools; Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W

Witney.—Adaptation of Witney Corn Exchange for public offices (3,400*l.*); Mr. W. G. Eaton, Surveyor, Witney Urban District Council.

Yarmouth.—Sixteen houses, Alderson-road; Mr. J. D. Harman, builder, 34, Northgates-street, Yarmouth.

York.—Children's receiving home, Haxby-road (1,250*l.*); Mr. G. Sykes, Clerk, Board of Guardians, York.

* **See also our list of Competitions, Contracts, etc., on another page**

GERMAN METHODS OF CEMENT MANUFACTURE.

In a paper read to the Association of American Portland cement manufacturers Dr. Otto Schott, of Heidelberg, states that so far as he can judge the cost of producing cement is lower in Germany than in the United States, and that for this state of things the lower rate of wages on the Continent is not alone responsible. Fuel is more costly, and so counterbalances the saving effected in labour. According to Dr. Schott, German economy is largely due to painstaking calculation and attention to minute details. The German tries to save every penny, to make full utilisation of waste heat, and to reduce manual labour to a minimum by adopting the newest forms of labour-saving plant. Special advantages are secured by the monthly cost calculations, which show clearly, and to the smallest detail, what is the actual cost in every department of work. The art of correctly calculating the actual costs, of studying them, and drawing therefrom the proper conclusions as to where the lever should be applied to reduce the cost of production, is one enabling the directors of some factories to manufacture more economically than others, who otherwise are just as favourably placed. In the opinion of Dr. Schott, the Germans have managed continually to reduce the cost of cement by correcting faults, introducing improvements, and making use of advantages, as suggested by the intelligent study of monthly cost calculations. The hint is one not undeserving attention by our own manufacturers.

SYLVESTER HOUSE, HACKNEY, N.E.

THIS town housing scheme has just been completed at Hackney in the centre of a district that has long been deplorably neglected. The improvement commenced with acquiring the leases of the houses on the site, and pulling them down in order to obtain a large enough area to make such an undertaking a success. Arrangements were also entered into with the Borough Council for widening Pigwell-path throughout its length, whereby a fine new street has been created, and an undesirable slum removed.

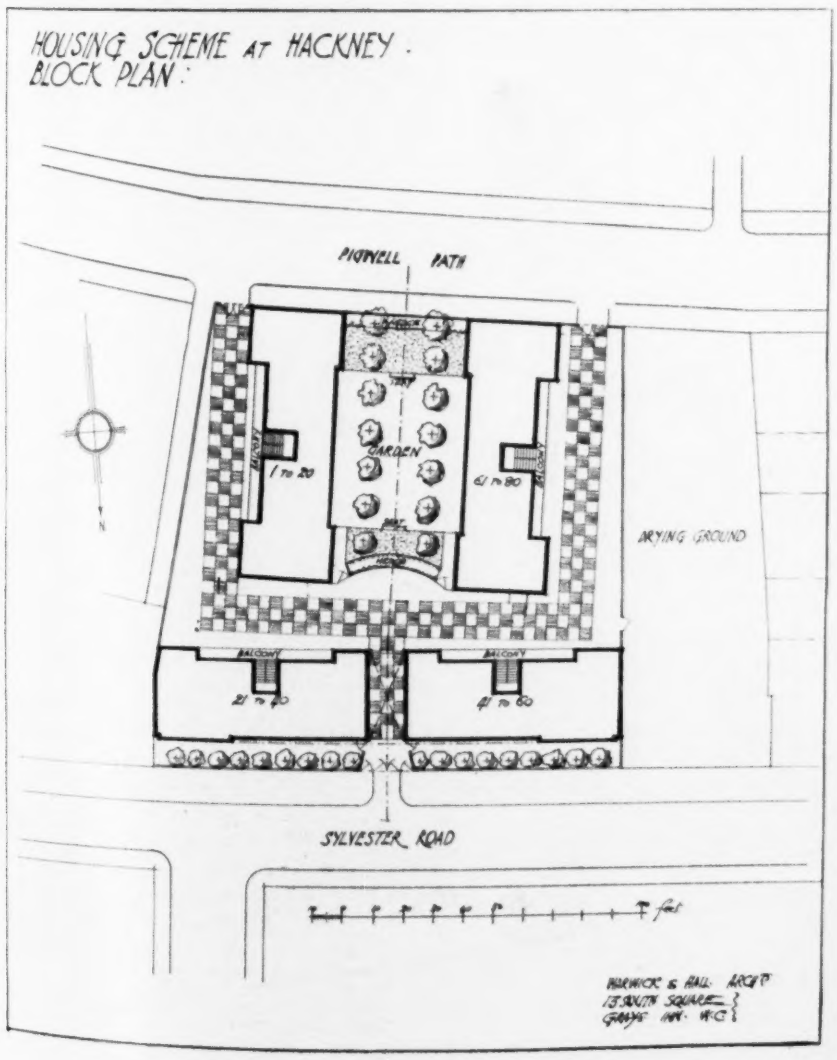
The buildings are planned so that every flat has the sun some time of the day, either in the rooms or on the balcony. The main entrance is from Sylvester-road, which is placed on the centre axis of the scheme; and the buildings consist of four blocks, with a central garden for the use of the tenants. A large drying-ground is adjoining, and plenty of yard space for the children to play in is provided.

The balcony system has been selected for the flats on the lines so successfully adopted by the London County Council, whose municipal dwelling-houses are probably the finest in the world.

The flats contain two, three, and four rooms, besides a scullery, with rentals from 6s. 6d. to 12s. a week, according to size and position. Every flat has a good living-room at least 13 ft. square, and the scullery is fitted with all the modern conveniences that the tenants require. The problem is one of the greatest economy of space combined with efficiency, and this has been obtained wherever possible.

It is seldom that an improvement of this nature is initiated and carried through by private owners, but the experiment has been made by Sir Richard Stapley and his partners, who have considerable interest in the borough, and who have always been keenly interested in social matters, and particularly in housing.

The architects are Messrs. Warwick & Hall, South-square, Gray's-inn, W.C., and the builders Messrs. F. & H. F. Higgs, of Loughborough Junction, S.E.



QUANTITY SURVEYORS IN SOUTH AFRICA.

By H. BELL-JOHN, F.S.I., A.M.S.E.

DURING the nine years that have elapsed since the completion of the South African War this country has seen many changes in the quantity surveying profession. All or most of these changes have tended not only to the improvement of methods in general, but also to the bringing about of a uniformity that might, in other circumstances, have taken many years longer to effect.

My object in these notes is to trace the rise of quantity surveying in South Africa since the Vereeniging Pact, and to show as clearly as possible its growth to its present, I think I may say, satisfactory position. It can be fairly claimed that the Public Works Department of the Transvaal has influenced this growth to a considerable degree. The work done in any country depends more or less on its needs and on what it is prepared to put up with. It is said that every country boasting a representative form of Government gets the government it deserves. In the same way it gets the architecture, the law, and, in due time, everything else. The tendency in new countries is to put up with things that in older would not be tolerated, and it is natural this should be so in a country like South Africa. The poorly-trained or unapt man is much in evidence. I do not mean by this that most professional men in South Africa are of the poor quality, but that the poor quality man is more likely to get work here than in England—work of responsible nature. The result is not of any benefit to the profession concerned as a whole or to the good men individually.

In such a country as ours there is the "make-a-pile-quickly" ambition pervading all ranks and all callings, and this does not encourage too much conscientiousness in work. If 2½ per cent. can be charged for a bill of quantities for a 2,000*l.* building, and it can be put on two pages of one's office notepaper, why should a man go to the foolish extreme of using a system and fifteen pages of properly-ruled and written foolscap? The fact of the two-page bill, including such items as "measure painter from joiner," only helps to leave room for the "allow for 2½ per cent. on above total for bills of quantities." When all is said, the house gets built, and the quantity surveyor (who, in so many cases, is the architect) gets his fees.

It is gratifying to be able to say that that sort of thing has had its day, and decent quantities are now a recognised part of a decent building contract. It is far preferable that no pretence should be made, and that works should be put to tender without quantities than that such makeshifts should be used. Many quite large buildings, public and private, have gone to tender without quantities, but as far as public buildings are concerned the time for such things has passed. The Public Works Department of the Union of South Africa issues quantities for practically all works costing over 500*l.*, and quantities that could be put beside most London bills without suffering from the comparison. The Johannesburg Municipality is busy preparing quantities for its large municipal buildings.

Before the union of the South African Colonies the Transvaal was the only colony with anything approaching an organised branch of quantity surveying in its Public Works Department. During the years since the war several reorganisations of the public service have taken place, but the quantity surveying branch of the Public Works Department has remained either as a distinct branch of the architectural branch, or as distinct from it under the Chief Engineer. Both systems have worked well, and at present with the quantity surveyor as also chief assistant to the architect, with the two branches under his administrative control, the arrangement is as good as it could be. The three assistant architects are, for design, responsible to the architect. There is no mixing up of draughtsmen's work with quantity assistants' work.

In 1902 the Public Works Department of the Transvaal engaged in London two quantity surveyors, an assistant quantity surveyor, and four "workers up." These were added to locally, and the leaven then put into the dough has leavened the whole loaf. To-day quantity surveyors in South Africa have a good and definite standing. Times and men have changed during the past eight years, and men from all over the sub-continent are now employed at Pretoria in the Public Works Department. Outside work has been scarce; departmental work has fortunately been plentiful, at least in the Transvaal, and the fact of all these outside men being temporarily employed under the Government quantity surveyor can bring nothing but good to them and to the profession.

In writing thus of the work done by the Civil Service quantity surveyors I have no intention of slighting the work done by surveyors in private practice—some of them in practice before the Service branch was in existence, and some in practice to-day in Cape Town, Johannesburg, Pretoria, and elsewhere.

The two factors that have counted most in the devolopment of the profession, in addition to the importation of trained surveyors by the Transvaal Government, are the Transvaal Society of Quantity Surveyors, founded in 1905, and in 1908 becoming the South African Institute of Quantity Surveyors, and the Federated Master Builders' Associations. The former now has over thirty members, and has consistently urged that quantities should be supplied for all large works. The latter has frequently refused to tender where quantities have not been supplied. The former has done a service by issuing in pamphlet form a guide to a standard system, not, it must be admitted, the final word in systems, but helpful as a starting-point to further developments.

The practice of architecture is, in the Transvaal, a close profession, and it is intended to try to extend the privilege to the Union. In the Bill to effect this it is hoped to obtain some recognition of the quantity surveyor. The only text-book on quantities as practised in South Africa is that by Mr. Cowin, who was at one time in practice at Cape Town. Now that the colonies are merged, it will probably require to be brought up to date subsequent to a standard

THE BUILDING TRADE.

STUCCO.

THE most durable stucco is obtained when cement is employed, but the trouble lies in the fact that cement sets quickly, much more quickly than lime, and cracks are liable to appear. If, however, just—with the accent on the word just—sufficient of each ingredient is used, and neither too little nor yet too much water is added, a stucco can be produced that is far superior to any other in weathering powers. If an excess of water is employed the plaster will not cling properly to the wall; yet, on the other hand, if too little be used, the cement plaster will dry so quickly that cracks are certain to result. Again, if too much cement is used cracks are liable to appear. Dryness in any form results in cracks, which in some cases are so fine as not to be discernible except by close inspection. These cracks will in time admit moisture, rain bearing sulphur and ammonia, which will in time break down the protective covering, and the stucco will fall away, either by disintegration or peeling.

One essential, therefore, to good work is that the plaster must not lose its dampness too rapidly, and this can be done by keeping the surface wetted or by way of damp cloths hung in front of the wall. It is also necessary to prevent the water in the cement being absorbed by the brickwork on which it rests, and this can be done by previously well wetting the brickwork.

To make a good weather resistant, the stucco must be dense. This can be obtained by mixing the concrete stiff, and yet contain the necessary water to prevent rapid drying, which will allow the plasterer to work rapidly. A very thorough mixing will accomplish this. Trowelling the surface should not be done too much, for although by this means density is accomplished, the result will only be the trouble of cracks when dry, which is to be avoided. Trowelling brings the water to the surface, and the work is liable to dry too rapidly.

The proportions of the various materials used is debatable. Whether the first or last coat should contain the most cement has to be considered from two points. The first coat, it is argued by some, should be the one containing the greatest percentage of cement, as it has to bind to the wall and support the outer coats. On the other hand, the last coat is the one attacked by the weather, therefore it should have the greater amount of cement is argued by others. Unfortunately, the greater the percentage of cement there is all the more tendency to crack, and unless great care is exercised a high percentage of cement is likely to produce this undesirable result. A medium percentage is therefore the best in the long run. Thus the coats—three are recommended, as two coat work is little more than ½ in. thick—may be composed of one Portland cement to two of clean, sharp sand. This for the first two coats. The finishing coat may be composed of Portland cement, sand, and clean, sharp shingle. As the cement is liable to expand during wetting and contract whilst drying the precautions previously mentioned should be taken. Lime stucco is preferred by some, because it is not liable to this trouble.

The sand and shingle must be sharp. Many a failure is due to the non-observance of this. Earthy matter or organic substances not only chemically combine with the cement and break down the stucco, but they prevent the cement from mechanically joining with the sand and shingle.

The first coat should be well scored to form a proper juncture with the second. The wall, too, should be properly prepared, well washed, and joints raked out if necessary. If the wall is old and has been exposed to the weather it should be washed down with a weak acid, as, for instance, muriatic acid. This should be done several days before the stucco is applied.

Uneven thicknesses of plastering should be avoided or cracks will result through uneven drying. Joints should therefore be filled in before the general coat is applied.

Where firring strips are used for the purpose of affixing metal mesh precautions must be taken to prevent danger from them. This arises from the fact that they are liable to split under the influence of wetting and drying at those places where staples have been driven in to fix the metal mesh, and, the mesh becoming loose, the stucco and mesh fall down. By attaching the mesh to the wood strips by galvanised-iron wire tied around both this danger is avoided.

A good lap should be given to the mesh joints, or at these places cracks in the stucco will appear. There is a danger in using metal lath where some patent plasters are used, as some of them contain acid, which attacks the metal. It is desirable, therefore, where such are used to give the mesh a coat of limewash or some similar protective coating.

Where lime is used with cement the limit should be 10 lb. of hydrated lime to one bag of cement, and this should only be used for the second coat. The first and last coats should not contain more than 5 lb. per bag of cement; in fact, it were better to use none at all in the finishing coat. Only hydrated lime should be used, and no plasterer's putty. Hydrated lime is lime scientifically prepared, being properly cleansed and screened, and is free from all impurities. A good substitute for sand used by the Americans is asbestos rock and fibre. The fibre performs the binding function of ox-hair in plastering, the stucco being less liable to crack. The use of asbestos fibre along with cement and sand can be recommended. Other aggregates, such as crushed marble, finely-crushed granite, and similar rocks are used where some special finish is desired.

To obtain a rough-cast finish, mix one part hydrated lime with two of Portland cement, mixed dry, and add water until a thick paste is obtained. Put this into a pail, and, keeping it well mixed, take out by means of a paddle or trowel, which, dashed against a stick held in the other hand, splashes the mixture on to the wall, giving the rough-cast finish.

Pebble dashing is composed of clean-washed pebbles mixed with a thick paste of the composition above. This gives a pebbly surface to the work. To obliterate any streaks showing after the finishing coat has been put on, a lime-cement wash can be used, which at the same time will fill in any cracks. To obtain a float finish, the surface is treated with a hand float in the ordinary way for plastering.

"Depeter" is a rough-cast into which pebbles or broken stones are pressed after the last coat has been floated and whilst it is still wet.

If tinting is to be done the colouring matter can be added to the cement-wash just mentioned, but the result is not so lasting as pigments mixed along with the stucco. Free lime in the concrete when moist chemically combines with many of the ordinary colour pigments, and also attacks any organic matter in the plaster. The use of paint, therefore, containing linseed oil should be avoided. The percentage of colouring matter to be added to the plaster depends upon the tint required. This may be a source of danger, because a high percentage of some pigments weakens the plaster. Yellow ochre can be added up to 8 per cent., and gives a bright tan colour. Yellowish brown or buff can be obtained from 5 per cent. yellow ochre and 2½ per cent. of permanganate brown. Black shades are obtained by using a small percentage of lampblack or carbon. For red, red oxide or iron are the only colours that can be safely employed. A strong, highly-priced oxide, whereby a small percentage only is necessary, is better than a weaker, cheaper grade. Black iron oxide will give a bluish shade of black. Brown is a colour not readily obtainable except at the expense of the plaster's strength.

Iron oxide can be used; the lime in the concrete acts on ferric chloride or ferric sulphate, giving a reddish-brown colour—a deposit of ferric hydroxide; but to obtain this 20 to 30 per cent. by weight of colouring matter is required. Green is another colour difficult to obtain. The only green pigment that will stand the lime action is chromium oxide, which is an expensive mineral pigment. The colouring values of the cheaper grades are very low. By mixing blue and yellow green can be produced, but the trouble is to obtain a good strong blue that will withstand the lime. A good blue is ultramarine blue, but it has a very poor colouring power when mixed with other pigments. It will, however, stand the action of the lime.

The alternative is to use a light-coloured plaster, but this means a more expensive stucco. Olive green can be obtained by using yellow ochre and a pigment of bluish tendency, as some of the blacks, but the brown, sandy shade of the concrete has yet to be overcome before a good green can be obtained. The alternative is painting the surface.

SOME LEGAL QUESTIONS ABOUT EXTRAS:

THE ARCHITECT AS ARBITRATOR.

WE have received the following communication from a well-known builder:—

"I am thoroughly in agreement with the remarks of Mr. J. E. Yerbury in your last issue as to the necessity for a revised form of contract. But whatever care may be taken in framing a revised form, I imagine that the legal profession will, until the end of time, persist in acting on the principle that law and justice are not necessarily synonymous. A lifelong experience in the building trade has brought this hard fact home to me on many occasions. More than once the R.I.B.A. form has been submitted, in my presence, to a barrister who had had no previous knowledge of the document, and after perusing it, he has asked me, with an air of questioning surprise, "And have you really signed this? Why you are entirely in the hands of the architect." Of course, some will say that it speaks volumes for the general integrity of the profession that there are comparatively few cases figuring in the courts. On the other hand, it must not be forgotten that, in by far the greater number of cases where builders consider they have a real grievance, considerations of expense or other equally cogent reasons may determine them to submit to what they deem injustice with what grace they may.

I am inclined to agree that the arbitrator should, by preference, be a lawyer, although the idea seemed a startling one at first. It is no slander to say that the architect, as arbitrator in his own case, is in an impossible position if an unbiassed, impartial decision is the desideratum. It is against human nature.

I have in my mind an architect for whom I have worked for at least a score of years, and with whom I have settled up as many jobs, always in a friendly manner, yet to me it is only too obvious when he has a client difficult to satisfy, or when his own plans or specifications chance to be a little bit faulty—as must happen sometimes to the most painstaking architect. In such circumstances he appears a different man altogether, and falls back upon his powers under the contract in a manner that, although entirely unconscious to himself, is patent to a student of human nature like myself. I very much doubt whether the strong and just architect alluded to by Mr. Yerbury really exists. Certainly, some of the architects of highest reputation in the profession fail to reach my ideal in these respects. Quite possibly herein I show my own bias. I am quite certain, however, that men at the top of the profession are not disinclined to shield their own reputation behind the broad back of the builder. The maintenance clauses, sometimes enforcing the remedying of defects over a period of one or, as in one case I know of, two years, and the withholding of the retention money,

are powerful weapons when the architect has a mind to do this. Twelve months bring to light many defects, not all of them due to bad material or faulty workmanship. I have had to replaster ceilings whose cracks were indubitably owing to ignoring the formulæ laid down as to the proportion the depths of joists and beams should bear to their span; to make good settlements undoubtedly caused by skimping the foundations in unsatisfactory soil; to renew casements badly designed for the purpose of keeping out wet; and so on. The unacknowledged but fully-understood penalty for neglecting to do so being the loss of the architect's favour and opportunities of tendering for his work. My advice was asked a short time ago with reference to a case in which the architect deliberately rejected tiles submitted by the builder, and ordered him to obtain tiles from a certain yard. These tiles went wrong, and after two years, the retention money having been withheld, the builder was ordered to strip the roof and retile with other tiles. To my mind, this architect's notion of fairness is embryonic, his idea of justice elemental. Yet he and the others are all of them, like Brutus, "honourable men." One can only echo Burns's cry, "O wad the Powers the giftie gi'e us, to see ourse'l's as others see us." There would be objection, of course, to the subsitution of a lawyer for an architect as arbitrator on the ground of lack of technical knowledge, but, I imagine, if lawyers were appointed as a regular thing, some of them would soon specialise in this particular direction.

I do not understand Mr. Yerbury's assertion in relation to extras, that the builder charges as much as he can. How can this be when the contract specially provides that these are to be measured and valued at contract rates? On the contrary, the standing grievance is that it is impossible to carry out the bulk of the extra works without incurring a serious loss. An additional door or window is ordered, and, notwithstanding the well-known fact that a single door or window will cost from 25 per cent. to 50 per cent. more than the same articles when made in quantities, the surveyor usually insists upon pricing at the contract rate for the larger quantities, and prates about the law of average. Times without number I have had to accept 1s. 6d. for an odd window which the shop-books show to have cost 2s., and so with other things: a little bit of garden wall, or a little bit of gas-pipe, ordered after the bricklayer or the gas-fitter have left the job, is supposed to be carried out at the same price as the bulk of the work, although men and tackle have to be brought back to the job on purpose to do these little joblets. Extras of this kind are a curse, and ruin many an otherwise profitable job. The ideal contract under the present system is undoubtedly that in which the plans and details, in a complete state, are handed to the contractor upon signing, and no deviations or extras occur. Architects never give consideration to the fact that variations almost inevitably mean delay, delay means disorganisation, disorganisation means loss. Six months in a builder's office as correspondence clerk would bring this home to them as nothing else could."

GOVERNMENT CONTRACTS.

The following tenders have been accepted during the past month by the Government Departments named:—*Admiralty, Works Department:* Granite pitchers—Messrs. A. & F. Manselle, 57, Gracechurch-street, E.C.; heating of detention quarters, Devonport—Messrs. Dean & Beale, Ltd., 1, Arthur-street, East, E.C. *Admiralty, Contract Department:* Fire-bricks—Messrs. Bonnybridge, Silica, & Fireclay Company, Ltd., Bonnybridge, Stirlingshire; Messrs. Candy & Co., Ltd., Heathfield Station, near Newton Abbot; Messrs. Martin Brothers, Ltd., 29, Lockyer-street, Plymouth; Messrs. Priestman Collieries, Ltd., Milburn-house, Newcastle-on-Tyne; Messrs. Westlake & Co., Calstock, Cornwall. *War Office:* Works services, erection of married soldiers' quarters, Royal Military College, Sandhurst—Messrs. T. Turner and G. Kersley, Frogmore, Blackwater, Hants; erection of barrack blocks, Dover—Messrs. G. Lewis & Sons, Widred-road, Dover; erection of forage barn, etc., Barry, Forfar—Mr. J. Raitt, 9, George-street, Montrose, N.B.; excavation work at Woolwich Dockyard—Messrs. F. & T. Thorne, Isle of Dogs, E.; periodical services, Fermoy and London (Wellington Barracks)—Mr. F. Holdsworth, 32, Saltaire-road, Shipley, Yorks; Tipperary—Mr. T. Kellcher, 4, Millard-street, Cork; Woolwich—Mr. F. Holdsworth, 32, Saltaire-road, Shipley, Yorks; renewing flooring, Aldershot—Mr. Jas. Crockerell, Stanhope Lines, Aldershot; structural steel and iron for coal bunkers, Woolwich—Widnes Foundry Company, Ltd., Widnes. *Crown Agents for the Colonies:* Cement—Messrs. Peters Bros., 72, Victoria-street, S.W.; Messrs. Martin Earle & Co., 139, Queen Victoria-street, E.C. *Office of Works:* Builders' work, Blackburn, alterations and additions to County Court—Messrs. W. J. Woof Cronshaw & Sons, Pump-street, Blackburn; British Museum, reconstruction of roof—Messrs. W. E. Blake, Ltd., Plymouth; Carnforth, new post office—Messrs. R. Thompson & Morris, 12, Dalton-square, Manchester; Croydon, enlargement of telephone exchange—Messrs. J. & M. Patrick, Wandsworth, S.W.; Devonport, extension of post office—Mr. A. N. Coles, Old Town-street, Plymouth; Edinburgh, new workshops at Brighton-street—Messrs. J. Scott & Brown, 3, Barclay-place, Edinburgh; Eltham, new post office—Messrs. Thomas & Edge, Woolwich, S.E.; Glasgow, temporary accommodation at head post office—Messrs. William McCall & Sons, 5, Balmano-street, Glasgow; Hull, adaptation of labour exchange—Mr. P. T. Kettlewell, 60, Trinity-street, Hull; Kidderminster, enlargement of post office—Mr. E. Crowdon, Farm-street, Birmingham; Maybole, new post office—Messrs. D. & J. Milligan, 46, Kyle-street, Ayr; Newcastle-on-Tyne, new branch post office at Heaton—Mr. J. Milne, Coatsworth-road, Gateshead; Romford, new post office—Mr. F. Wilmott, 36, High-road, Ilford; western telephone exchange erection—Messrs. Howell J. Williams, Ltd., 11-17, Bermondsey-street, S.E.; Woking, alterations to post office—Mr. McCarthy E. Fitt, 118, Oxford-road, Reading; pavement and vertical lights, British Museum extension—Messrs. Thaddeus Hyatt & Co., 9, Farringdon-road, E.C. *Commissioners of Woods:* Pair of stone cottages at Ford, Inverleiver, Co. Argyll—Mr. J. Carmichael, Kilmichael, Glassary, Lockgilphead, N.B. *Commissioners of Public Works, Ireland:* Erecting and furnishing Malinmore National School—Mr. R. Colhoun 22, Strand-road, Londonderry.

GENERAL BUILDING NEWS.

NEW FREE CHURCH, FRINTON-ON-SEA.

The plans of this church have been prepared by Mr. W. Hayne, J.P., architect, of Frinton-on-Sea, and the builders are Messrs. Potter & Sons, of Chelmsford. The contract price is 3,332*l.*

NEW SCHOOL, EDINBURGH.

A new higher grade school is to be erected on a site at Viewforth, at a cost of 54,000*l.*, to provide accommodation for 1,200 pupils. The architect for the work is Mr. John A. Carfrae, of Queen-street, Edinburgh.

REMODELLED SCHOOL, MACDUFF.

The alterations to this school have been carried out under the direction of Messrs. Sutherland & George, architects, of Aberdeen. The various contractors were:—Mason work—Mr. J. G. Corbett, Fraserburgh; carpenter work—Mr. J. Watt, jun., Inverurie; slater work—Mr. Forbes Morrison, jun., Aberdeen; plaster work—Messrs. Roger & Baxter, Aberdeen; plumber work—Mr. J. Connell, Macduff; painter work—Messrs. Gordon & Watt, Aberdeen; heating—Messrs. J. Blaikie & Sons, Aberdeen; block flooring—The Acme Block Flooring Company, London.

NEW BANK, ASHTON-UNDER-LYNE.

The new buildings of the Ashton Savings Bank have been erected from designs—selected in competition—prepared by Messrs. W. H. George & Sons, architects, of Ashton. The cost of the erection was 3,800*l.*, and the builders were Messrs. Saxon Bros., of Stalybridge.

NEW WORKHOUSE INFIRMARY, READING.

These buildings, which were opened last Saturday by Mr. John Burns, have been erected at a cost of 13,738*l.*, from the designs of Mr. W. Roland Howell, F.R.I.B.A., architect, of London and Reading, and the various contractors were:—Messrs. H. W. Godwin & Co., Church-street, Reading, additions to nurses' home. Mr. McCarthy E. Fitt, Oxford-road, Reading, the committee-room block, the aged and infirm block, and the mortuary. Mr. Francis Newberry, King's-road, Reading, the additions to the porter's lodge and the building of the operating department. The sub-contractors included the Kleine Patent Fire-Resisting Syndicate, Ltd., of 133, High Holborn, W.C., who laid the floors and roof of the aged and infirm block and the roof of the operating department; Messrs. Val de Travers, of Bishopsgate-street, E.C., who laid the asphalt on roofs; Messrs. Vulcanite, Ltd., of 115, Cannon-street, E.C., who executed portions of the roofs of the nurses' home, committee-room block and porter's lodge; Messrs. Diespeker, Ltd., of Holborn Viaduct, E.C., who laid all the Terrazzo flooring; Messrs. Bain & Co., of 22, Cannon-street, E.C., who erected the outside iron staircase; Messrs. A. Brown & Co., of 61, Smallbrook-street, Birmingham, who supplied the door and window fittings; Messrs. Baughan, of London-street, Reading, who installed the electric light in the operating-room block and the bells and telephones in the block for the aged and infirm; Messrs. Dennison, Kett, & Co., of 11, Queen Victoria-street, E.C., who supplied the lift in the same block.

BANK, NEWCASTLE-ON-TYNE.

Considerable extensions and alterations have been made to the Lambton branch, Grey-street, of Lloyds Bank, Ltd. Adjoining premises were obtained, which were rebuilt, the basement and ground floor added to the bank, and the upper floors are offices. The bank is fitted up in mahogany, the floor of public space is vitreous and ceramic mosaic, and behind counter in oak. The floor of managers' and consulting rooms is finished with parquetry. The general contractors were S. F. Davidson & Miller; mosaic by Emley & Sons, Ltd.; fireplaces by Henry Walker & Son, Ltd., and Emley; plastering by Davidson & Miller and John Chapman; electric installation by S. Gillitt; locks and hardware by N. F. Ramsey & Co.; painting and decoration by John G. Cole and Davidson & Miller; heating by The R. J. Ward Company (all of Newcastle); stanchions, columns, and girders by Dorman, Long, & Co., Ltd., Middlesbrough; fireproof floors by The Fawcett Construction Company, Ltd., Greenwich; wood block floors and parquetry by The Art Pavements and Decorations, Ltd., London; sanitary fittings by Doulton & Co., Ltd., London; electric passenger lifts by Waygood & Co., Ltd., London, and Pickerings, Ltd., Stockton-on-Tees; and a specially built basement lift by Pickerings; electric fittings by Best & Lloyd, Birmingham, and Veritys, Ltd., Manchester; entrance doors by The Van Kannel Revolving Door Company, Ltd., London. New fittings, counters, desks, etc., which are in mahogany, were made by Robson & Sons, Ltd., Newcastle. The whole of the work was designed by and carried out under the personal direction of Mr. John W. Dyson, architect, Newcastle, and Mr. C. H. Davies was clerk of works.

DRURY-LANE THEATRE.

Considerable structural alterations and decorative works are in progress at Drury-lane Theatre, which reaches its centenary next year. The vestibule is being entirely remodelled in connexion with the reconstruction work. The ceiling has been panelled, and enriched beams added with a modillion cornice to the walls. The walls have been treated with a 6-ft. high dado in polished mahogany, running all round the vestibule, and in place of the old solid doors leading to the rotunda and staircases French doors in mahogany have been put with bevelled plate-glass panels. The existing lobby doors have also been brought into harmony with the new scheme of decoration. The large saloon over the vestibule is also in the hands of the decorators, and considerable additions are being made to it. The main staircase ceilings needing reconstruction, an opportunity has been taken to put in a modelled ceiling with new lantern lights over each staircase. The architects are Messrs. Pilditch.

NEW BUILDINGS IN LONDON.

Rebuilding premises, Poppin's-court, E.C.; Messrs. Dove Bros., builders, Islington. Shops, etc., Great Portland-street and Great Castle-street, W.; Mr. W. E. Blake, builder, Montague-place, W.C. Shops, showrooms, etc., Princes-street, W.; Messrs. T. H. Kingerlee & Sons, builders, Oxford. Rebuilding premises, Oxford-circus, W., for Madame Louise, draper, etc.

HER MAJESTY'S OPERA HOUSE, WINTER GARDENS, BLACKPOOL.

The Opera House and Grand Foyer, Blackpool, has just been opened. No additional land was taken in for the new building, but the avilable space has been so utilised as to provide seating accommodation for 2,300 people, as compared with 1,500 in the old building. The style adopted is Louis XIV., and the façade is of Marmo, relieved with ornamental railings along the balcony. The main entrance in Church-street may be described as a marble hall, for there is a white marble staircase leading up to the royal circle and foyer; the floor is of black and white marble laid in chess-board fashion, and round the walls there is a dado of Brêche Violette marble. The fibrous plaster work in front of the private boxes and royal circle is taken from a model of an ancient château in France. The orchestra stalls consist of inlaid mahogany

Sheraton chairs, a special feature being upper and lower shelf fitted at back of each chair for opera glasses, gloves, hats, or other small articles. The royal circle, the circle, and the pit stalls are equipped with tip-up chairs. In no seat of the theatre is there any obstruction of view, and with nine exits on the ground floor, three in royal circle and gallery, the theatre can be emptied in a comparatively short space of time. The whole of the building and the various tiers are of the latest fireproof construction. The grand foyer is a large hall for use in connexion with the dress circle, with a balcony for use in connexion with the upper circle, and is based on the lines of the foyer of the Paris Opera House. The grand foyer is situated over the main entrance, and is approached from the royal circle level by a white marble staircase. The balustrade in the entrance to the foyer is of white marble. The decoration of the grand foyer has been carried out in the same style as the theatre, except that the colours differ. There are sixteen Corinthian columns of Sienna marble with gilt caps, against the cream and gold tones of the plaster enrichment on the walls, and above there are four classic pictures on the ceiling, the whole being surmounted by a coffered dome ceiling relieved with gold. The plans and designs of the present theatre were prepared by Messrs. Mangnall & Littlewood, of Manchester, and the work has been carried out by the following firms:—General contractors — Messrs. Parkinson & Sons, Blackpool; front elevation —Messrs. The Leeds Fireclay Company, Ltd., Leeds; steel work—Messrs. Samuel Butler & Co., Stanningley, Leeds; heating and ventilation—Messrs. Saunders & Taylor, Manchester; fibrous plaster decorations, carpeting and seating, draperies and curtains—Messrs. Waring & Gillow, London; marble work — Messrs. Anthony Bell & Sons, Lancaster; ornamental ironwork—Messrs. Cunliffe & Dean, Manchester; lead lights—Mr. Walter J. Pearce, Manchester; tile work—Mr. A. Ollivant, Shelton, Stoke-on-Trent; electrical fittings—Messrs. Edison & Swan, Liverpool; electrical installation—Messrs. The Blackpool Winter Gardens Company.

NEW LIBRARY, INVERURIE.

This Carnegie library has been erected at a cost of 1,500*l.* from the plans prepared by Mr. Harbourne Maclennan, of Messrs. Jenkins & Marr, architects, of Aberdeen. The contractors for the work were:—Mason—Mr. John Smith, Kintore; carpenters—Messrs. Edward & Rae, Dyce; slater—Mr. Forbes Morrison, Aberdeen; plumbers—Messrs. James Laing & Sons, Inverurie; plasterers—Messrs. Grant & Robertson, Inverurie; asphalt work—Messrs. Bradshaw & Co., Glasgow; painter and glazier work—Messrs. J. W. Forrest & Co., Aberdeen; steel and iron work—Messrs. James Abernethy & Co., Aberdeen.

TRADE NEWS.

Messrs. Trollope & Colls, of London, have added an engineering department to the firm for the design and construction of structures in reinforced concrete or steel work. The offices of this department are at 5, Coleman-street, E.C.

The Woodford Church, Cheshire, is being ventilated by means of Shorland's patent concealed extract ventilators and inlet ventilators, supplied by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

Under the direction of the Norfolk Education Committee, Boyle's latest patent "air-pump" ventilators have been applied to North Lopham Schools.

Messrs. Patman & Fotheringham, Ltd., 100 and 102, Theobald's-road, London, W.C., have secured two contracts for works in alterations and additions at both His Majesty's Theatre, Haymarket, W., and the Savoy Theatre, Strand, W.C.

Under the direction of Messrs. Baker & Wrightson, architects, Clacton-on-Sea, Boyle's latest patent "air-pump" ventilators have been applied to St. Paul's Church, Clacton-on-Sea.

The Brightside Foundry and Engineering Company, Ltd., of Sheffield, London, and Birmingham, have secured the contract for the heating and ventilating installation at the British Museum extensions (King Edward VII. Galleries). The buildings are being erected to the designs of Mr. John James Burnet, A.R.S.A., F.R.I.B.A., of Glasgow.

The new Council school at Long Ditton-hill, Surbiton, has recently been fitted with D. O. Boyd's Hygiastic ventilating school grate, supplied by Messrs. O'Brien, Thomas, & Co., Upper Thames-street, London, E.C., and Excelsior Works, South Bermondsey.

Samples of Belgian bricks are now on view at Gidea Park, where particulars may be obtained. The Bruges pattern is the make mostly used for new work and restorations, and the price, delivered at the Squirrel's Heath sidings, before the strike, worked out at about 20*s.* per ton, or 26*s.* per 1,000. Prices may now, however, be slightly raised, owing to the strike.

The new Council schools, Swindon, have been supplied with Shorland's warm air ventilating Manchester grates by Messrs. E. H. Shorland & Brother, Ltd., of Failsworth, Manchester.

A new warehouse is being erected at Uxbridge for the Metropolitan Railway Company, the architect being Mr. W. L. Eves, of Uxbridge, and Messrs. Fasenidge & Son, of Uxbridge, the contractors. Two new warehouse lifts are being installed by the Lift and Hoist Company, of Deptford, who have also just completed two lifts for the new station at Hitchin for the Great Northern Railway Company.

The Café Monico is being altered under the direction of Messrs. Kemp & How, architects, FF.R.I.B.A., 4, Bloomsbury-square. The two new lifts, iron staircases, and lantern lights are being executed by the Lift and Hoist Company, Premier Engineering Works, Deptford, S.E.

PROJECTED NEW BUILDINGS IN THE PROVINCES.*

ABERDEEN.—Extensions to King's College; the Managers.

Aberystwith.—Museum (31,000*l.*); Messrs. E. Turner & Sons, builders, Penarth-road, Grangetown, Cardiff.

Ashford.—Technical instruction buildings; Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W.

Ayr.—Additions to school, Green-street-lane (450*l.*); School Board, Ayr. Re-erection of farm buildings, Cunning Park (1,200*l.*); the Managers.

Barnsley.—Proposed baths (7,500*l.*); Mr. J. Henry Taylor, Surveyor, Barnsley Town Council.

Bexley.—Extensions, Welling Council School (250 places); Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W.

Blackpool.—Workshop and meter testing shop, Hull-street (2,500*l.*); Fylde Water Board.

Bognor.—Workmen's dwellings (3,500*l.*); Mr. O. A. Bridges, Surveyor, Bognor Urban District Council.

Bridlington.—Laundry at workhouse (900*l.*); Mr. G. Hankinson, Clerk, Board of Guardians, Bridlington.

Brookland.—Proposed school (100 places); Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W.

Cambridge.—Alterations, Railway Hotel; the Proprietors. Servants' wing, Christ's College, Hobson-street; the Governors.

Carnoustie.—Abattoir 400*l.*); Messrs. D. Anderson & Son, builders, Dundee.

Carronshore. — Proposed school (5,000*l.*); Larbert School Board.

Chelmsford. — Extensions, public library (800*l.*); Mr. C. Brown, Surveyor, Chelmsford Town Council.

Clowne.—Four houses, Spring-hill, Whitwell, for the Worksop Co-operative Society.

Dukinfield. — Proposed town hall; Mr. Samuel Hague, Surveyor, Dukinfield Town Council.

Dundee.—College (60,000*l.*); Mr. T. Martin Cappon, architect, 32, Bank-street, Dundee.

Eastwood (Notts).—Proposed swimming bath; Mr. A. G. Wheeler, Surveyor, Eastwood Urban District Council.

Edenbridge.—Special subject building; Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W. Alterations to school, Haxted-road (550*l.*); Mr. E. Leigh, builder, Westhill, Edenbridge.

Elham.—Hospital (3,560*l.*); Mr. R. Lonergan, Clerk, Board of Guardians, Folkestone.

Ferryhill.—Four houses for the Coxhoe Co-operative Stores.

Garstang.—Proposed new public offices; Mr C. Thornton, Clerk, Garstang Board of Guardians

Gillingham. — Royal Naval and Marine Orphanage, Oxford-road; the Managers.

Glasgow.—Houses, Gallowgate and Graham-square; Mr. Thomas Aitken, 447, Gallowgate, Glasgow.

Halstead.—Swimming bath; Mr. W. A. Nicholson, Surveyor, Halstead Urban District Council.

Hollingworth.—Fire brigade house, Arrowsmith Mill, for the Calico Printers' Association.

Horsell.—Sixty-eight villas and branch store (20,000*l.*); Woking Co-operative Society.

Huthwaite.—Free library, Sutton-road; Mr. G. Bostock, Surveyor, Huthwaite Town Council.

Johnstone. — Proposed slaughter house (2,000*l.*); Messrs. Kerr & Watson, architects, Houston-square, Johnstone.

Kirkby Laythorpe.—Restoration of parish church (600*l.*); Messrs. Bowman & Sons, builders, Cherry Holt-lane, Stamford.

Langholm.—Additions to woollen mills for Messrs. McIntyre, Cairne, & Co.

Lowestoft.—Smith and wheelwrights' shops; Mr. G. H. Hamby, Surveyor, Lowestoft Town Council. The following plans have been passed: — Alterations, 21, Marine-parade; Mr. J. T. Woolnough. Alterations to Belvedere Hotel, Belvedere-road; Messrs. Youngman, Prestman, & Co. Four houses, Worthing-road; Mrs. Warden. Six houses, London-road South: Mr. R. C. Todd.

Methil.—School, Bayview Park (10,000*l.*); Mr. G. C. Campbell, architect, Methil.

Milnrow.—Extensions to premises, Two Bridges-lane, for the Newhey Cotton Spinning Company. School, Crossley-street; Dr. H. L. Snape, Secretary, Education Committee, Lancaster County Council.

Newcastle-on-Tyne.—Alterations of offices of *Newcastle Chronicle*; the Proprietors.

Peterhead.—Houses, etc., Constitution-street; Mr. James Dickie, Surveyor, Peterhead Town Council.

Radcliffe. — Rebuilding technical school (9,200*l.*); Mr. John Allen, builder, Railway-street, Radcliffe.

Rainsford.—Proposed workmen's dwellings; Mr. C. Brown, Surveyor, Chelmsford Town Council.

St. Dennis (Cornwall).—Liberal club-rooms (300*l.*); the Secretary.

Sale.—Public baths (6,700*l.*): Mr. William Holt, Surveyor, Holt Urban District Council.

Saltash.—Alterations, St. Barnabas Hospital; the Governors.

Selby.—Eight cottages; Messrs. Lister Brooke & Co., builders, Brighouse.

Stalybridge.—Improvements to St. Paul's Church, Staley (700*l.*); the Trustees.

Stannington.—Asylum (76,600*l.*): Messrs. W. Moss & Sons, builders, Baxter Gate, Loughborough.

Stepps.—Enlargement, parish church; the Trustees.

Surbiton.—Extension to Council's offices; Messrs. Forsyth & Maule, architects, care of the Clerk to the Council.

Sutton-at-Hone (Kent). — Enlargement of Hextable School; the Managers.

Tynemouth.—Extensions, Tynemouth Infirmary (600*l.*); the Managers.

Viewforth.—School (54,000*l.*); Edinburgh School Board.

Wednesbury.—Alterations, Coach and Horse Inn; the Managers.

Wigton.—Additions and alterations, clothing factory, Station-road, for Messrs. S. Redmayne & Sons.

Willesborough (Kent).—Proposed extensions to schools; Mr. F. W. Crook, Secretary, Education Committee, Kent County Council, Caxton House, Westminster, S.W

Witney.—Adaptation of Witney Corn Exchange for public offices (3,400*l.*): Mr. W. G. Eaton, Surveyor, Witney Urban District Council.

Yarmouth.—Sixteen houses, Alderson-road; Mr. J. D. Harman, builder, 34, Northgates-street, Yarmouth.

York.—Children's receiving home, Haxby-road (1,250*l.*): Mr. G. Sykes, Clerk, Board of Guardians, York.

* See also our list of Competitions, Contracts, etc., on another page.

GERMAN METHODS OF CEMENT MANUFACTURE.

In a paper read to the Association of American Portland cement manufacturers Dr. Otto Schott, of Heidelberg, states that so far as he can judge the cost of producing cement is lower in Germany than in the United States, and that for this state of things the lower rate of wages on the Continent is not alone responsible. Fuel is more costly, and so counterbalances the saving effected in labour. According to Dr. Schott, German economy is largely due to painstaking calculation and attention to minute details. The German tries to save every penny, to make full utilisation of waste heat, and to reduce manual labour to a minimum by adopting the newest forms of labour-saving plant. Special advantages are secured by the monthly cost calculations, which show clearly, and to the smallest detail, what is the actual cost in every department of work. The art of correctly calculating the actual costs, of studying them, and drawing therefrom the proper conclusions as to where the lever should be applied to reduce the cost of production, is one enabling the directors of some factories to manufacture more economically than others, who otherwise are just as favourably placed. In the opinion of Dr. Schott, the Germans have managed continually to reduce the cost of cement by correcting faults, introducing improvements, and making use of advantages, as suggested by the intelligent study of monthly cost calculations. The hint is one not undeserving attention by our own manufacturers.

SYLVESTER HOUSE, HACKNEY, N.E.

This town housing scheme has just been completed at Hackney in the centre of a district that has long been deplorably neglected. The improvement commenced with acquiring the leases of the houses on the site, and pulling them down in order to obtain a large enough area to make such an undertaking a success. Arrangements were also entered into with the Borough Council for widening Pigwell-path throughout its length, whereby a fine new street has been created, and an undesirable slum removed.

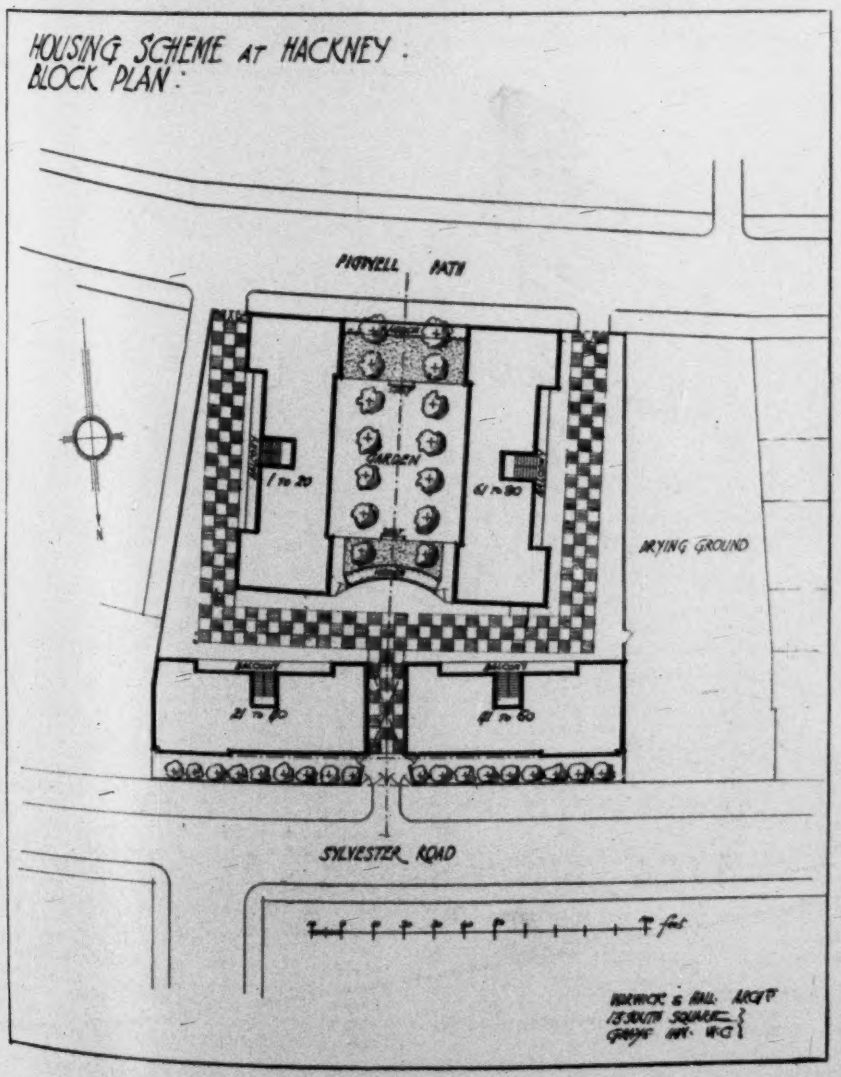
The buildings are planned so that every flat has the sun some time of the day, either in the rooms or on the balcony. The main entrance is from Sylvester-road, which is placed on the centre axis of the scheme; and the buildings consist of four blocks, with a central garden for the use of the tenants. A large drying-ground is adjoining, and plenty of yard space for the children to play in is provided.

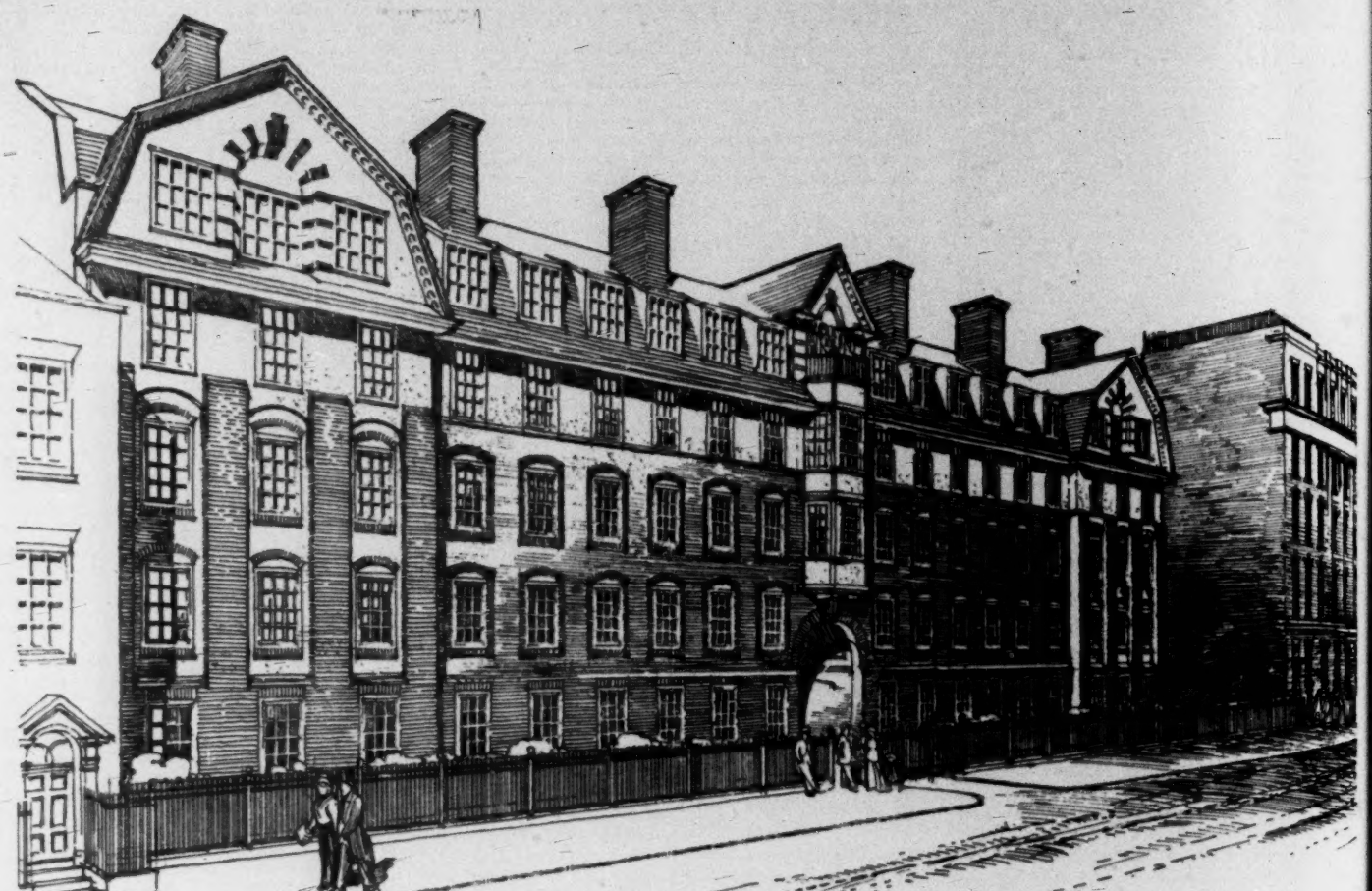
The balcony system has been selected for the flats on the lines so successfully adopted by the London County Council, whose municipal dwelling-houses are probably the finest in the world.

The flats contain two, three, and four rooms, besides a scullery, with rentals from 6s. 6d. to 12s. a week, according to size and position. Every flat has a good living-room at least 13 ft. square, and the scullery is fitted with all the modern conveniences that the tenants require. The problem is one of the greatest economy of space combined with efficiency, and this has been obtained wherever possible.

It is seldom that an improvement of this nature is initiated and carried through by private owners, but the experiment has been made by Sir Richard Stapley and his partners, who have considerable interest in the borough, and who have always been keenly interested in social matters, and particularly in housing.

The architects are Messrs. Warwick & Hall, South-square, Gray's-inn, W.C., and the builders Messrs. F. & H. F. Higgs, of Loughborough Junction, S.E.


HOUSING SCHEME AT HACKNEY.
BLOCK PLAN.
PIGWELL PATH
GARDEN
DRYING GROUND
SYLVESTER ROAD
1 in 20
1 in 50
1 in 50
1 in 50



TOWN HOUSING SCHEME AT HACKNEY FOR • SIR RICHARD STAPLEY • • WILLIAM SMITH ESQ • AND • • HENRY SMITH ESQ •

WARWICK & HALL ARCHITECTS 13 SOUTH SQ. GRAYS INN. W.C.

(See preceding page.)

system being agreed on between the Institute and the master builders.

In conclusion, it is necessary to remind readers that the white population of the Union of South Africa is only about one million and a half, that its territory is over six times the area of great Britain, and that the standards of England cannot apply in quantity, though they may in quality, to this country. The profession is in a promising position. Much has been done, though much remains to do. Forces are at work which cannot be withstood, and it may be reliably prophesied for the profession here, that it has before it a future of great usefulness, much prosperity, and honour.

A NEW METAL FILAMENT LAMP.

On the 16th inst. the British Thomson-Houston Company entertained a company of representatives of the technical and lay Press at Rugby, where their general factory is situated, in order to bring to their attention a new filament which they have discovered and are now placing on the market. Their guests were shown over their works and the large factory, particularly in detail, and the process of manufacture, with its organisation into innumerable divisions of labour, was made plain.

As is well known, the firm is American in its origin, and is still mainly under American control, and the various departments are, for the most part, under gentlemen of that nationality. The site was chosen, and the works begun, by a German firm, displaying the German logic in the choice of a place at once so central and so well served by several railway systems as is Rugby.

As now in being, the Company was formed in May, 1896, and when its Rugby factory was completed in 1901 the number of people employed by the undertaking was only 500. In 1906 this number had increased to 2,000, and at the present date the number of hands in regular employment at the works, offices, etc., is over 3,000.

The works are now carried on upon some 25 acres of land, whilst the floor space occupied has been more than doubled, being at the present time upwards of 500,000 square feet.

The Company cover in their operations practically the whole field of electrical engineering and manufacture. They turn out a complete assortment of electric lamps, including the Edison Carbon and Gem types, and the Mazda (metal filament type). They design and equip rail and tram lines, build electric locomotives and all types of electric power plant. They are proprietors of the patent rights for the United Kingdom of the General Electric Company of America (the largest electric manufacturing Company in the world), the Allgemeine Elektricitats Gesellschaft of Germany, and the French Thomson-Houston Company.

The Company have been engaged in the manufacture of electric lamps since 1902, and were among the first to manufacture metal filament lamps in this country. They have been among the foremost in all improvements and developments of electric lamp manufacture from carbon to metal filament, and have now placed a new electric incandescent lamp upon the British market. It is a new development of the well-known "Mazda" lamp and denotes a momentous advance in the making of electric lamps. The lamp is of the metal filament class employing tungsten filaments. But it differs from all the others in the circumstance that it is constructed with a solid-drawn wire of tungsten, instead of the brittle strands of pressed or "squirted" tungsten employed in other lamps of the metallic filament class.

After three years of laboratory work the Company and their associates have succeeded in rendering tungsten into a ductile form and drawing it into a wire.

The better to appreciate the importance of this development it is necessary to understand the conditions which have governed the manufacture of metallic filament lamps hitherto. As is generally known, the filaments are formed by pressing through a die a mixture of powdered tungsten and a binder, the latter being subsequently removed. The resulting filaments, consisting of particles of tungsten locally fused together, are obviously of an extremely brittle nature, and consequently the tungsten filament lamp has not been able to withstand ordinarily rough usage.

The risk of breakage is substantially reduced by the elimination of the rigid connexions which have hitherto been a feature of tungsten filament lamps. Instead of short lengths, welded to the supports at four or five different points, the filament is formed in one continuous length, wound upon spider supports with clamped flexible connexions to the leading-in wires. The drawn filament is, besides, continuous, and is not subject to the variations noticeable in the ordinary metal filament lamps, where, as is often the case, one section of the filament will burn at higher temperature than the rest, thus reducing the life of the lamp. The enormous advance represented by the production of a drawn wire tungsten filament of accurate uniformity and continuous length is obvious.

A Note on Tungsten.

Tungsten has heretofore been known chiefly as a steel-hardening metal. In recent years, however, it has become an important material for filaments of incandescent lamps, and is to-day the most efficient metal for this purpose, owing to its high melting point (3,000° C.), which is higher than that of any other metal, and its low vapour tension.

The metal has ordinarily been obtainable in commerce in the form of a dark grey powder, usually made by the reduction of the yellow oxide by hydrogen or by carbon.

Even in ordinary commercial lamps the filaments are of a degree of purity so high that no impurities can be discovered by the most searching methods of chemical analysis known. Not only is this true, but these filaments, during the course of commercial production, are exposed to temperatures high enough to drive out by mere vaporisation almost any impurity.

Nevertheless, these filaments show no traces whatever of ductility, or even pliability, but, on the contrary, though strong enough for mounting in commercial lamps, they are exceedingly brittle and incapable of taking a permanent set. Attempts have hitherto been made—but always without success—to produce ductile tungsten by various purification processes, varying the ore from which the tungsten is obtained by trying first wolframite (an iron-manganese tungstate) and then scheelite (the calcium tungstate).

Announcement has recently been made, however, of the production of tungsten in a form in which it is ductile. This ductile tungsten would seem to be a new substance from the point of view of the physical chemist.

Ductile tungsten is a bright, tough, steel-coloured metal, which can be drawn into the finest wire, much below one thousandth of an inch. The tensile strength of the wire increases as the drawing proceeds; or, in other words, the more the metal is mechanically worked the tougher and stronger it gets.

LONDON COUNCILS.

Croydon.—The relation of diphtheria to sanitary defects in houses is examined by Dr. H. M. Richards, the Medical Officer of Health, in his annual report. He says that the proportion of houses infected with diphtheria that were found to have serious defects in their drains was 7.3, a figure which is rather less than those found in the two preceding years. The figure confirms the view that sanitary defects are not an important factor in the causation of diphtheria. Dr. Richards, in another portion of his report, says that the number of systems of combined drainage dealt with as single private drains during the year was fifty. This work was carried out under the provisions of the Croydon Corporation Act, 1905. The cost of carrying out the necessary works amounted to 536*l.*, and was borne by the owners instead of, as elsewhere, by the inhabitants at large. 905 back yards were paved during the twelve months. This was a considerable increase over the number dealt with in the previous year, and is a record of work of considerable sanitary value.

Friern Barnet.—The Local Government Board has sanctioned a loan of 2,500*l.* for improvement works at Friary Park. Application is to be made to the Local Government Board for sanction to borrow 3,600*l.*, to be expended, in addition to 2,000*l.* received from the Middlesex County Council, in widening the bridge over the Great Northern Railway. The Local Government Board is also to be applied to for sanction to borow 440*l.* for a new road from Sydney-road to Alexandra-road. The following plans have been passed:—Six houses, Ashurst-road, for Mr. G. S. Scott; eight houses, Chandos-avenue, for Mr. J. Farrer; four houses, Friern-lane, for Mr E. K. Wilton; depôt for horses and house, for Messrs. Carter, Paterson, & Co.

Marylebone.—The Medical Officer of Health, in his annual report, says that the total number of inspections made by the drainage inspectors was 8,323, as against 6,850 in the previous year. The number of plans relating to drainage of new buildings was fifty-two. In the case of old buildings the number of plans received was 570. The total number of plans deposited was 622, as against 521 in the previous twelve months. The number of orders under seal as to combined drainage granted by the Council was twenty-seven, as against twenty-three the previous year. In fourteen cases the liability of the Council for the reconstruction of the combined portions of existing drains was admitted, and the work carried out by the Works Committee at the request of the Public Health Committee.

Surbiton.—The Council has accepted the tender of Messrs. Dick, Kerr, & Co., at 33,468*l.* 15s. for the installation of the northern sewers, plant, etc., in connexion with the new sewerage scheme. Twelve tenders were received. Messrs. Forsyth & Maule, the Architects to the Board, have been instructed to report upon the best way of extending the Council's offices.

FOREIGN AND COLONIAL.

The Alabaster Industry, Italy.

Owing to the competition of Germany and France, the marble and alabaster commercial statuary, which constituted until lately one of the most flourishing industries in Florence, is (writes the British Consul) passing through a very serious crisis. Most of the sculpture seen in the Florence shops is not marble, but alabaster, which, while very transparent in its natural state, becomes opaque and slightly granulous, similar in appearance to the Carrara and Serravezza marble, through the process of baking. Not being, however, so hard, it has the advantage of being more easily worked, with an economy of 50 per cent. in labour. White alabaster is only to be found in the province of Pisa, and, we are informed, that a group of Tuscan financiers is negotiating with the quarry owners to secure a monopoly in this for the purpose of combating foreign competition.

American Cement Production in 1910.

Statistics collected by the United States Geological Survey show that the total quantity of Portland, natural, and pozzuolanic cement manufactured in that country during 1910 amounted to 76,934,675 barrels, valued at 13,610,554*l.* Compared with the previous year, this represents an increase of more than ten million barrels, or 15·3 per cent. in quantity and 26·9 per cent. in value.

The total output of Portland cement for the same year was 75,699,485 barrels, equal to nearly thirteen million tons, valued at 21s. per ton. The output of pig iron in the United States for 1910 was 27,298,545 tons, valued at 61s. 6d. per ton. Hence the production of Portland cement was approximately 47 per cent. that of pig iron in quantity and 16 per cent. in value.

The foregoing figures suffice to make clear that the term "cement age" has not been applied without reason to the present epoch.

Building Work, Spain.

The *Gaceta* of August 1 notifies that tenders will be opened on September 5, at the "Dirección General de Obras Públicas, Ministerio de Fomento," Madrid, for carrying out the first section of the harbour works at Adra, in the province of Almeria. The upset price is put at 1,937,000 pesetas (about 72,000*l.*).

The *Gaceta* of August 2 notifies that tenders will be opened on August 31 at the "Ministerio de Instruccion Pública y Bellas Artes," Madrid, for completing the building in course of erection for the General and Technical Institute of Granada. The upset price is put at 401,000 pesetas (about 15,000*l.*).

Although the two foregoing contracts will in all probability be awarded to Spanish firms, nevertheless the carrying out of the works may involve the purchase of some materials out of Spain.

Railway Works, etc., Netherlands East Indies.

According to the *Nederlandsche Staatscourant* of August 1, the Netherlands East Indies Budget for 1911 contains provisions for:—(1) An increase of 350,000 gulden (29,000*l.*) for building the railway from Bandjar to Parigi; (2) an increase which will now bring the total amount set aside for the erection of the Colonial building at Amsterdam up to 278,800 gulden; (3) an increase of 383,500 gulden (32,375*l.*) for the construction of steam tramways from Tjikampek to Lemahabang and from Rambipoedji to Poeger.

Abyssinia.

The following information is from the report by H.M. Consul at Adis Ababa (Major C. H. M. Doughty Wylie, C.M.G.) on the trade of Abyssinia in 1910, which will shortly be issued:—

There is an import of ready-made windows and doors, etc., by the railway. This import will doubtless increase with the arrival of the rails in Adis Ababa. Wood is scarce, bad, and very expensive in Shoa. The same increase will probably take place in iron girders and building materials generally.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xvi.; Auction Sales, xxii.

Certain conditions beyond those given in the following information are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

Competitions.

SEPTEMBER 4. — **Newcastle-on-Tyne.** — The Education Committee invite from architects practising in Newcastle designs for a senior mixed school and a junior mixed school, each to accommodate 365 children. Assessor nominated by R.I.B.A.

SEPTEMBER 5.—**Skegness.**—COTTAGE HOSPITAL.—Mr. E. R. Sutton, F.R.I.B.A., Assessor. Premium 15*l.* 15*s.*

SEPTEMBER 9. — **Pontefract.** — SWIMMING-BATHS.—Open to architects of the West Riding of Yorkshire. Particulars from the Borough Surveyor.

SEPTEMBER 12-25.—**Athens.**—COURT OF JUSTICE.—An international competition is instituted by the Ministry of the Interior, for the erection of Court buildings, to cost 160,000*l.* The *Official Gazette* may be seen at the Library of the R.I.B.A.

SEPTEMBER 16. — **Manchester.** — LIBRARY AND ART GALLERIES.—Limited to the ten selected competitors in the first competition. See issue of June 23, p. 780.

OCTOBER 4. — **Easington R.D.C.** — 100 model houses for Murton Colliery, Durham. 2½ per cent. on net cost to successful architect.

OCTOBER 7. — **Barnsley.** — EXTENSION OF BATHS.—The Barnsley T.C. invite drawings for proposed extension of Public Baths. Three premiums are offered. See advertisement in issue of August 11 for further particulars.

OCTOBER 12.—**Coseley.**—Plans are invited for a school to accommodate about 200 children. Particulars from the Education Offices, Coseley, near Bilston.

OCTOBER 14. — **Bristol.** — ALTERATIONS IN THE GRAND HOTEL. — Particulars from Mr. F. A. Jenkins, 44, Corn-street, Bristol.

OCTOBER 30.—**Holland.**—STAINED GLASS WINDOW.—Designs are invited for a stained glass window to be erected in the University at Groningen. See advertisement in issue of June 9 for further particulars.

OCTOBER 31. — **Marylebone.** — NEW MUNICIPAL BUILDINGS.—Premiums of 100*l.*, 75*l.*, 50*l.* The assessor is Mr. Henry T. Hare, F.R.I.B.A. See advertisement in issue of July 14 for further particulars.

NOVEMBER 1. — **City of St. Petersburg.**—MONUMENT TO ALEXANDER II.—Particulars in our issue of August 13, 1910.

NOVEMBER 30.—**Cardiff.**—TECHNICAL INSTITUTE.—The Cardiff Education Committee invite designs and estimates for a technical institute. See advertisement in issue of August 18 for further particulars. Successful architect to carry out work. Premiums of 125*l.*, 75*l.*, and 50*l.* to other competitors. Mr. J. S. Gibson, assessor.

* NOVEMBER 30. — **Hastings.** — EAST SUSSEX HOSPITAL.—The Joint Committee of the East Sussex Hospital and King Edward VII. Memorial Funds invite designs for new hospital. See advertisement in this issue for further particulars. Premiums of 125*l.*, 75*l.*, and 50*l.* Mr E. T. Hall, assessor.

DECEMBER 29. — **Glasgow.** — DESIGN FOR A BRIDGE.—Designs are invited (Alexander Thomson Travelling Studentship) for a bridge. Premiums of 60*l.* and 20*l.* are offered. See advertisement in issue of December 24 for further particulars.

JANUARY 31, 1912. — **Australia.** — DESIGNS FOR FEDERAL CAPITAL CITY.—The Government of the Commonwealth of Australia invite competitive designs for the laying out of this Federal capital city. See advertisement in issue of July 7 for further particulars.

JULY 1, 1912.—**Dusseldorf.**—A plan for the extension of the City of Dusseldorf. Premiums of 1,000*l.* to 375*l.* Conditions on application to the Chief Burgomaster, Dusseldorf.

NO DATE. — **Nottingham.** — BAPTIST CHURCH AND PREMISES.—Limited to Nottingham architects. Particulars from Messrs. Rorke & Jackson, solicitors, King-street, Nottingham.

NO DATE.—**Rochdale Infirmary.**—EXTENSIONS.—Assessor, Mr. Alex. Graham, F.R.I.B.A.

NO DATE.—**Salford.**—Extension of office accommodation on workhouse site at Eccles New-road. Premiums 20*l.* and 10*l.* Particulars from the Board of Guardians, Salford. Limited to architects practising in Salford and district only.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

AUGUST 25.—**Southsea.**—SHOP, ETC.—For altering existing premises and building shop, showrooms, and stores, for Messrs. S. Sperber & Sons. Plans and specifications seen, and quantities from the architects, Messrs. Rake & Cogswell, Prudential-buildings, Portsmouth.

AUGUST 26. — **Eccles.** — HOUSES.—Erection of three houses. Mr. Luke Barlow, Hanover-chambers, 8, King-street, Manchester.

AUGUST 26. — **Frindsbury.** — ALTERATIONS.—Execution of alterations to the teachers' dwelling-house. Specifications and plans by the Committee's Architect, Mr. Wilfrid H. Robinson, of Caxton House, Westminster, seen with Mr. R. A. Arnold, The Precinct, Rochester, Kent.

AUGUST 26.—**Mallaig.**—ADDITIONS.—For additions to public school at Mallaig. Plans seen, and quantities from Mr. J. G. Falconer, architect, Fort William, Scotland.

AUGUST 26.—**New Tredegar.**—URINAL.—Erection of a four-stall public urinal at the Workmen's Hall. Plans and specification with the Council's Surveyor, Mr. J. H. Lewis, A.M.Inst.C.E., Blackwood, Mon.

AUGUST 26. — **Skirbeck.** — CAGING.—Construction of iron caging at the police-station. Specifications from Mr. E. J. A. Christie, Market-place, Boston, Lincs.

AUGUST 28.—**Altofts.**—CORN CHAMBER.—Erection of a corn chamber. Plan and specification at the D.C. Office, Altofts.

AUGUST 28. — **Bristol.** — SEWER.—Construction of a tank sewer in Hennebique's system of ferro-concrete at Chaplin-road, Easton. Drawing seen, and specifications and quantities, on deposit of 2*l.*, from Mr. Thos Henry Yabbicom, M.Inst.C.E., City Engineer, 63, Queen-square, Bristol.

AUGUST 28. — **Cardiff.**—VESTRY, ETC.—Erection of a vestry and heating chamber. Plans and specifications from the Rev. D. T. Evans, 5, Eton-place, Cardiff.

AUGUST 28. — **Kincraig.**—MANSE.—Erection of a manse at Alvie. Plans and specifications with Mr. A. Cattanach, architect, Kincraig, Scotland.

AUGUST 28.—**St. Agnes.**—SHOP.—Erection of a shop. Plans and specifications from Messrs. R. H. and E. W. Tonkin, architects and surveyors, Tregoney.

AUGUST 28. — **Scunthorpe.**—ADDITIONS, ETC.—Alterations and additions to the latrine buildings at the Church of England schools. Plans and specification at the Vicarage House. Messrs. W. S. Walker, F.R.I.B.A., & Son, architects and surveyors, 77, Lowgate, Hull.

AUGUST 29. — **Cambridge.**—ALTERATIONS.—Repairs and alterations to No. 12, Corn Exchange-street. Plan and specification with the Borough Surveyor, Guildhall, Cambridge.

AUGUST 29. — **Consett.** — ADDITIONS, ETC.—For alterations, additions, etc., for the Consett Industrial and Provident Society, Ltd. Plans and specification from Mr. J. J. Eltringham, architect, Derwent-street, Blackhill.

AUGUST 30.—**Cardigan.**—COWHOUSE, ETC.—For the erection, at Penlan Farm, near Cardigan, of a ten-stalled cowhouse, with hay-room and piggeries; and for the reflooring and reroofing of a granary. Plans and specifications with Mr. James Williams, builder, of Kilgerran.

AUGUST 30. — **Warminster.** — COTTAGE.—Erection of a cottage. Drawing and specification with Mr. A. F. Long, architect, 53, Market-place, Warminster.

AUGUST 30. — **West Hartlepool.** — HOUSES.—Erection of three houses, Colwyn-road. Plans, specification, and particulars from Mr. Wm. Young, architect, Park-road, West Hartlepool.

AUGUST 31.—**Exeter.**—BUILDINGS.—Erection of farm buildings at Wear Barton, Countess Wear, near Exeter. Plans and specifications seen, and quantities, on deposit of 3*l.*, from Messrs. E. H. Harbottle & Son, architects, County-chambers, Exeter.

* AUGUST 31. — **Leytonstone, N.E.** — NEW FOUNDATIONS, ETC.—The West Ham Union invite tenders for (1) formations of new foundations, etc., to boilers, etc. (2) construction of steel water tank; (3) supply and delivery of Lancashire boiler, at Union Infirmary, Leytonstone. See advertisement in this issue for further particulars

AUGUST 31. — **Rhondda.** — ROOFS.—Erection of galvanised roofs at the Porth and Ystrad Gasworks. Plans and specification seen, and form of tender from Mr. O. Thomas, Engineer and Manager, Gas and Water Offices, Pentre, Rhondda, Wales. Deposit of 1*l.* 1*s.*

SEPTEMBER 1.—**Attleborough.**—COOKERY-ROOM, ETC. — Erection of new cookery-room, playshed, etc. Names to the Secretary, Education Offices, Shirehall, Norwich. Deposit of 1*l.* 1*s.*

SEPTEMBER 1. — **Brighton.**—ALTERATIONS.—For alterations to the Grafton-street lavatories. Specification and form of tender from the Borough Surveyor, Town Hall, Brighton.

SEPTEMBER 1. — **Warrington.** — WORKS.—For various works at the Evelyn-street Council school. Specifications from the architect, Mr. T. A. Buttery, L.R.I.B.A., Exchange-buildings, Queen-street, Morley.

* SEPTEMBER 1.—**Winchester.**—COTTAGES.—The Managers of the Hursley Estate invite tenders for four pairs of cottages on the Hursley Estate. See advertisement in this issue for further particulars.

SEPTEMBER 2. — **Cardigan.** — ALTERATION.—For alteration of business premises. Mr. J. T. J. Williams, architect, Napier-street, Cardigan.

SEPTEMBER 2. — **Totnes.**—BUILDINGS.—Erection of buildings, bullock and sheep pens, in Totnes Market. Plans and specification from the Borough Surveyor, Mr. W. F. Tollit, 10, High-street, Totnes.

* SEPTEMBER 3.—**Barrow-in-Furness.**—OFFICES.—Tenders are invited for the building of new offices for Messrs. Vickers, Ltd., at Barrow-in-Furness. See advertisement in this issue for further particulars.

SEPTEMBER 4.—**Heaton.**—CHURCH.—Erection of a new church. Plans and specifications with Messrs. Austin & Paley, architects, Lancaster. Quantities from Messrs. Wright & Son, surveyors, Lancaster.

SEPTEMBER 5. — **Newport.**—BARGE.—Construction of a dumb hopper barge. Specification from Mr. A. J. Phillips, Clerk to the Commissioners, Harbour and Pilotage Offices, Dock-street, Newport.

* SEPTEMBER 6.—**Grays.**—DRILL-HALL, ETC.—The Essex Territorial Force Association invite tenders for drill hall, instructor's quarters, stores, etc., at Grays. See advertisement in this issue for further particulars.

* SEPTEMBER 6.—**Romford.**—DRILL-HALL, ETC.—The Essex Territorial Force Association invite tenders for drill-hall, instructor's quarters, stores, stabling, etc., at Romford. See advertisement in this issue for further particulars.

SEPTEMBER 8.—**Addington.**—ADDITIONS.—Erection of additions to coal store at Addington Waterworks. Plans and specifications seen, and quantities, on deposit of 1*l.* 1*s.*, from the Borough Engineer, Town Hall, Croydon.

* SEPTEMBER 8.—**Croydon.**—ADDITIONS TO COAL STORE. — The Croydon B.C. invite tenders for additions to coal store at Addington Waterworks. See advertisement in this issue for further particulars.

* SEPTEMBER 9.—**Sutton.**—SANITARY ANNEXES, ETC.—The Metropolitan Asylums Board invite tenders for sanitary annexes and alterations to laundry at Belmont Workhouse, Sutton, Surrey. See advertisement in this issue for further particulars.

* SEPTEMBER 12. — **Aldershot.**—ADDITIONS, ETC.—The Commissioners of H.M. Works and Public Buildings invite tenders for alterations and additions to the Royal Pavilion. See advertisement in this issue for further particulars.

* SEPTEMBER 15.—**Barrow-in-Furness.**—EXTENSION OF POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for extension of post-office. See advertisement in this issue for further particulars.

SEPTEMBER 16.—**Chester.**—HOUSE, ETC.—Erection of one single dwelling-house and one set of farm buildings, on the Moston Estate, near Sandbach. Plans seen, and specifications and quantities, on deposit of 1*l.*, from the C.C. Land Agent, County Estate Office, 49, Northgate-street, Chester.

SEPTEMBER 18.—**London.**—OFFICES.—Extension of the offices, 95, The Grove, Stratford, for the West Ham Education Committee. Mr. W. Jacques, A.R.I.B.A., Architect to the Education Committee, 2, Fen-court, Fenchurch-street, E.C. Deposit of 5*l.* for quantities.

* SEPTEMBER 18. — **Stratford.** — EXTENSION OF OFFICES.—The West Ham Education Committee invite tenders for the extension of the offices, 95, The Grove, Stratford See advertisement in this issue for further particulars.

SEPTEMBER 18.—**Wigan.**—REMOVAL.—For the removal of the wooden-constructed water-cooling tower at the Pemberton Electricity Works. Mr. James Slevin, Electrical Engineer, Bradford-place, Wigan

SEPTEMBER 19. — **Oxhill.** — WALL, ETC.—For rebuilding of retaining wall, and foundations for new school. Plans and specification seen, and quantities from Mr. N. Richley, Shire Hall, Durham.

* SEPTEMBER 20 — **Hammersmith.**—LAVATORY ACCOMMODATION AND SHELTER.—The Hammersmith B.C. invite tenders for erection of lavatory accommodation and shelters at Wormholt Park. See advertisement in this issue for further particulars.

SEPTEMBER 20.—**London.**—SHELTERS, ETC.—Erection of lavatory accommodation and shelters at Wormholt Park, Hammersmith. Plans seen, and specification and quantities from Mr. H.

BUILDING—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

Mair, Borough Surveyor, Town Hall, Hammersmith, W.

SEPTEMBER 21. — **Ellesmere Port.** — SCHOOL.—Erection of a new elementary school. Plans and specifications seen, and quantities, on deposit of 1*l.* 1s., from Messrs. Deacon & Horsburgh, architects, 12, St. George's-crescent, Liverpool.

SEPTEMBER 21. — **Maldon.** — POLICE-STATION.—Erection of a police-station. Drawings, specification, and form of contract seen, and quantities, on deposit of 5*l.*, from the County Architect, Mr. F. Whitmore, Duke-street, Chelmsford.

SEPTEMBER 21.—**Neston.**—ADDITIONS, ETC.—For new handicraft and cookery centres, and alterations to the Council school. Plans and specifications seen, and quantities, on deposit of 1*l.* 1s., from Messrs. Deacon & Horsburgh, architects, 12, St. George's-crescent, Liverpool.

OCTOBER 2.—**Lingfield.**—DRILL HALL.—Erection of new drill hall premises. Drawings, specifications, and conditions with Messrs. Jarvis & Richards, architects to the Association, 10, Queen Anne's-gate, Westminster, S.W. Quantities and forms of tender from Messrs. Robinson & Roods, quantity surveyors, 8, New-court, Carey-street, Lincoln's-inn, W.C., on deposit of 1*l.* 1s.

No DATE. — **Basford.** — ALTERATION.—For the alteration of lavatories, water-closets, etc., at the Basford Union Workhouse. Architect, Mr. W. V. Betts, 630, Radford-road, Old Basford. Deposit of 1*l.* 1s.

No DATE.—**Blyth.**—HOUSES.—Large number of small houses required to be built. Estate Office, Blyth, Northumberland.

No DATE. — **Craghead.**—HOUSES.—Erection of thirty-two houses. Quantities from Mr. J. Wm. Rounthwaite, A.R.I.B.A., architect, 13, Mosley-street, Newcastle-on-Tyne.

No DATE. — **Ferryhill.**—CHURCH.—Erection of an Independent Methodist church at Dean Bank. Plans and specifications from Mr. J. R. Grosart, architect, Durham-road, Finden-hill, Sacriston.

‡ No DATE.—**Grays.**—COTTAGES.—The Stepney Guardians invite tenders for two cottages at Stifford Homes, near Grays, Essex. See advertisement in this issue for further particulars.

No DATE. — **Haslan1.** — DEMOLITION.—For the demolition of the old toll bar house and two adjoining cottages. Particulars from the Borough Surveyor, Salter-gate, Chesterfield.

No DATE.—**South Kirby.**—HOUSES.—For building twenty houses. Plans with Mr. C. H. Charlesworth, Market-hill, Barnsley

No DATE. — **Tredegar.** — ALTERATIONS. — For alterations to Wesley Chapel. Quantities and particulars from Messrs. La Trobe & Weston, F.R.I.B.A., architects, 44, Corn-street, Bristol.

ENGINEERING, IRON, AND STEEL.

AUGUST 31. — **Great Yarmouth.** — HEATING.—For heating the Free Library and Museum. Plans and specifications from Mr. J. W. Cockrill, Borough Surveyor, Town Hall, Great Yarmouth.

SEPTEMBER 2. — **London.**—ECONOMISER.—Erection of an economiser for Public Baths, Latchmere-road, Battersea. Plans and specification at the Town Hall, Lavender-hill, S.W. Mr. W. Marcus Wilkins, Town Clerk.

SEPTEMBER 5.—**Leeds.**—CHIMNEY.—Construction of a chimney and flue at the Destructor Works. Specification and drawings seen, and quantities from Mr. W. T. Lancashire, M.Inst.C.E., City Engineer, Municipal Buildings, Leeds.

SEPTEMBER 6. — **Bradford.**—TANK WORKS.—For erection, at the new sludge disposal works, of a quantity of cast-iron tank work. Particulars from Mr. Joseph Garfield, A.M.Inst.C.E., Esholt Hall, Bradford.

SEPTEMBER 6. — **Wicklow.** — BRIDGES. — The Dublin and South-Eastern Railway Company invite tenders for the reconstruction of three bridges carrying the railway over the Ovoca and Aughrim Rivers, near Woodenbridge, Co. Wicklow. Plans and specification seen, and quantities from the Chief Engineer, No. 52, Westland-row, Dublin.

SEPTEMBER 6.—**Woodenbridge.**—BRIDGES.—Reconstruction of three bridges over the Ovoca and Aughrim rivers, near Woodenbridge, Co. Wicklow, for the Dublin and South-Eastern Railway Company. Plans and specification seen, and quantities from the Chief Engineer, 52, Westland-row, Dublin.

SEPTEMBER 8. — **Bedford.** — RESERVOIR.—Construction of filters and service reservoir. Quantities from the engineer, Major Hector Tulloch, C.B., R.E., at his office, No. 28, Victoria-street, Westminster, London, S.W., on deposit of 2*l.* 2s.

SEPTEMBER 8. — **East Cowes.** — RESERVOIR.—Erection of a ferro-concrete reservoir (Kahn system). Plans and specifications with Mr. Albert E. Barton, Surveyor, Town Hall, East Cowes, I.W. Deposit of 2*l.*

SEPTEMBER 11.—**Llandudno.**—WATER MAIN, ETC.—Construction of a surface-water main drain and sea outfall. Drawings and specification seen, and quantities, on deposit of 10s. 6d., from Mr. W. T. Ward, Deputy-Engineer, Town Hall, Llandudno.

* SEPTEMBER 12. — **Basingstoke.**—HEATING.—The Hants C.C. invite tenders for low-pressure hot-water apparatus at High School for Girls. See advertisement in this issue for further particulars.

SEPTEMBER 25.—**Aberdeen.**—DESTRUCTOR.—Construction of a refuse destructor. Mr. W. Dyack, M.Inst.C.E., Burgh Surveyor, Town House, Aberdeen.

No DATE.—**Chesterfield.**—HEATING.—For new heating apparatus for the Roman Catholic schools. Plan and specification from Mr. W. Cecil Jackson, M.S.A., architect, 29, Knifesmith gate, Chesterfield.

No DATE. — **Salford.** — TANKS.—Supply of two cast-iron tanks. Specification from the Superintendent, Blackfriars-road Baths, Salford

FURNITURE, PAINTING, MATERIALS, etc.

AUGUST 28. — **Barrow-in-Furness.**—PAINTING.—For painting the wood and ironwork at the electricity works. Specification from the Borough Electrical Engineer, Electricity Works.

AUGUST 28. — **Llanllyfni.** — PAINTING, ETC.—For painting and repairs of the Salem Chapel and minister's house. Specification at the Council school house. Mr. G. Llewelyn Griffith, 105, High-road, Llanllyfni, Wales.

AUGUST 28. — **London.**—FENCING.—Erection at Grovelands Park, Winchmore Hill, of Jarrah timber fencing and unclimbable wrought-iron railing. Specification and particulars from the Council's Surveyor, Mr. C. G. Lawson, C.E., Council Offices, Palmer's Green, N. Deposit of 2*l.*

AUGUST 29.—**Beverley.**—PAINTING.—For painting portions of the East Riding Lunatic Asylum. Specification at the asylum. Mr. C. W. Hobson, Clerk, Newbegin, Beverley.

AUGUST 30. — **Acrefair.**—PAINTING, ETC.—For cleaning and painting the chapel. Specification at the Chapel House. Mr. R. H. Gabriel, Church-street, Rhosymedre, Ruabon.

AUGUST 30.—**Arclid.**—PAINTING.—For painting outside of Workhouse premises and Infirmary, for the Guardians. Specification with the Master of the Workhouse.

SEPTEMBER 2.—**Berwick-upon-Tweed.**—PAINTING.—For painting farm buildings on the Corporation estate. Mr. W. J. Bolam, 42, Hide-hill, Berwick-on-Tweed.

SEPTEMBER 2. — **Maldon.**—PAINTING, ETC.—For repainting and repairing the outside of the Union Workhouse. Specification at the Workhouse Master's Office.

SEPTEMBER 2.—**Nottingham.**—PAINTING, ETC.—For internal cleaning and painting at various sub-police-stations and at the Central Station, Guildhall. Specifications, quantities, and forms of tender from the City Architect, Mr. F. B. Lewis, Guildhall, on deposit of 1*l.* 1s

SEPTEMBER 4.—**Lancaster.**—PAINTING.—For external painting of the main block of the Institution buildings, for the Committee of the Royal Albert Institution, Lancaster. Mr. S. Keir, Secretary.

SEPTEMBER 9.—**Jarrow.**—PAINTING.—For painting at the Primrose-hill Hospital. Specification from Mr. J. S. Weir, A.M.Inst.C.E., Borough Surveyor, Town Hall, Jarrow.

* SEPTEMBER 13. — **London, E.** — REPAIRS AND PAINTING.—The Poplar Board of Guardians invite tenders for repairs and painting works at casual wards, St. Leonard's-street, Bromley-by-Bow, E. See advertisement in this issue for further particulars

ROADS, SANITARY AND WATER WORKS.

AUGUST 29. — **Aylesbury.** — STREETS. — For private street works. Plans and specification seen, and quantities from Mr. Wm. Harold Taylor, Engineer and Surveyor, Town Hall, Aylesbury, on deposit of 1*l.* 1s

AUGUST 29.—**Blackpool.**—PIPES.—The Fylde Water Board invite tenders for the supply of cast-iron pipes. Specification and quantities from Mr J Cook, Engineer, Sefton-street, Blackpool.

AUGUST 29.—**Chelmsford.**—PATHS.—Repairing of footpaths in the borough. Specification and forms of tender from the Borough Surveyor's Office, 16, London-road, Chelmsford.

AUGUST 29. — **Cowes.**—MATERIAL.—Supply of granite and road material. Specification from Mr. John W. Webster, Engineer and Surveyor to the Council, High-street, Cowes.

AUGUST 29. — **Gateshead.** — STREETS. — For paving various streets. Plans and specifications seen, and quantities from Mr. N. P. Pattinson, Borough Engineer, Town Hall, Gateshead.

AUGUST 29.—**London.**—STREETS.—For private street works at Wimbledon. Plans and specifications from the Borough Surveyor, Town Hall.

AUGUST 29.—**Shoreham-by-Sea.**—SEWERS, ETC.—Construction of sewers, etc. Plans seen, and specifications and quantities, on deposit of 1*l.* 1s., from Mr. A. W. Nye, Town Surveyor, Town Hall, Shoreham.

AUGUST 29.—**Thornton Hough.**—SEWAGE.—Construction of sewers and sewage disposal works. Drawings and specification and quantities with the engineers, Messrs. Priest & Ellis, MM.Inst.C.E., 13, Harrington-street, Liverpool. Quantities on deposit of 2*l.* 2s.

AUGUST 30.—**Aylesbury.**—CLINKER.—Supply of washed and graded clinker. Particulars from Mr. Wm. Harold Taylor, Engineer and Surveyor, Town Hall, Aylesbury.

AUGUST 30. — **Carshalton.** — GRANITE. — For supply of granite, etc. Particulars from the Surveyor, Mr. W. Willis Gale, A.M.Inst.C.E., The Square, Carshalton.

AUGUST 30. — **Dundee.**—KERB, ETC.—Supply of granite steps, kerb for weir, cope, etc., for Lintrathen Reservoir. Specification and form of tender from Mr. George Baxter, Engineer and Manager, 93, Commercial-street, Dundee.

AUGUST 30.—**Egginton.**—SEWAGE.—Laying of socket pipe sewer Specifications from Surveyor, Mr. F. W. Bullock, Egginton, Derby.

AUGUST 30.—**London.**—STREETS.—For private street improvements at Palmer's Green and Southgate. Plans and specification, on deposit of 2*l.*, from the Council's Surveyor, Mr. C. G. Lawson, C.E., Council Offices, Palmer's Green, N.

AUGUST 30.—**Ramsgate.**—CEMENT.—Supply of Portland cement. Schedule and form of tender from Mr. T. G. Taylor, Borough Engineer and Surveyor, Municipal Offices, Ramsgate.

AUGUST 30. — **Swansea.** — SEWAGE.—Construction of sewers. Plans and specifications from Mr. T. T Williams, Engineer, Alexandra-road, Swansea

AUGUST 31.—**London.**—GRANITE.—Supply of Guernsey granite spalls, to be delivered at the Workhouse, Union-road, Leytonstone, N.E. Mr. T. Smith, Clerk, Board-room, Union-road, Leytonstone, N.E.

AUGUST 31.—**Tynemouth.**—SEWER.—Construction of pipe sewer near Seaton Delavel. Plans and specifications with Mr. A. S. Dinning, 21, Ellison-place, Newcastle-on-Tyne.

SEPTEMBER 2.—**Faversham.**—GRANITE.—Supply of granite. Apply to Mr. G. Tassell, Town Clerk, 20, West-street, Faversham.

SEPTEMBER 2. — **Kirkcaldy.** — ROADS. — For making roads, etc. Plan seen, and specification and quantities from the Burgh Surveyor.

SEPTEMBER 2. — **Saffron Walden.** — STREETS.—For private street works. Plans and specifications from the Borough Surveyor, Mr. A. H. Forbes, Hill-street, Saffron Walden.

SEPTEMBER 2. — **Yorkshire.** — DRAINAGE.—For surface drainage works at Steeton and Cowling. Plans seen, and specification and quantities, on deposit of 1*l.*, from Mr. F. G. Carpenter, West Riding Surveyor, County Hall, Wakefield.

SEPTEMBER 4 — **Bromley.** — MATERIALS.—For supply of road materials. Mr. E. Haslehurst, Clerk, Council Offices, Park House, Bromley, Kent.

SEPTEMBER 4. — **Finchley.**—SLABS.—Supply of paving slabs. Drawings and specification with the Surveyor to the Council, Mr. C. J. Jenkin, M.Inst.C.E., Council Offices, Church End, Finchley, N. Deposit of 2*l.*

SEPTEMBER 4.—**Flimby.**—SEWER.—For construction of a sewer. Particulars from Mr. J. B. Wilson, A.M.Inst.C.E., Grecian Villa, Cockermouth.

SEPTEMBER 4. — **Mansfield.** — STREETS. — For making-up streets. Specification and drawings seen, and quantities from Mr. T. P. Collinge, A.M.Inst.C.E., Borough Engineer and Surveyor, Exchange-row, Mansfield.

SEPTEMBER 4. — **Portslade.** — ROADS. — For making-up roads. Specifications from the Surveyor, Mr. A. Taylor Allen, 46, St. Andrew's-road, Portslade-by-Sea. Deposit of 1*l.* 1s.

SEPTEMBER 5.—**Pembroke.**—SEWAGE.—Construction of brick or pipe sewers. Plans and specification from Mr. J. C. Manly, Clerk, Town Hall, Ball's Bridge, Pembroke, Co. Dublin, Ireland.

SEPTEMBER 6. — **Morley.**—PAVING.—For paving of the carriageway and crossings. Specification and quantities from Mr. W. E. Putman, A.M.Inst.C.E., Borough Engineeer and Surveyor, Town Hall, Morley.

SEPTEMBER 7. — **Henley-in-Arden.**—SEWAGE.—Construction of a cast-iron tank sewer and other works. Drawings and specification may be seen, and quantities, on deposit of 3*l.* 3s., from the engineers, Messrs. Willcox, Raikes, & Reed, 63, Temple-row, Birmingham.

SEPTEMBER 7.—**Stratford-on-Avon.**—SEWAGE.—Construction of stoneware pipe sewers. Drawings and specification seen, and quantities, on deposit of 3*l.* 3s., from the engineers, Messrs. Willcox, Raikes, & Reed, 63, Temple-row, Birmingham.

SEPTEMBER 9.—**Walkden.**—SEWAGE.—For sewering a portion of the East Ward. Specifications and quantities from the Engineer and Surveyor, Mr. J. Howard, Town Hall, Walkden, on deposit of 2*l.*

SEPTEMBER 11. — **Dagenham.** — SEWAGE.—Construction of stoneware pipe branch sewers. Plans, specification, and particulars from Mr. W. J. Grant, Surveyor to the Council, Victoria-chambers, Romford.

SEPTEMBER 11.—**Stanley.**—STREETS.—Formation of private streets. Plans and specifications seen, and quantities from Mr. J. Routledge, Surveyor, Stanley, Durham.

SEPTEMBER 21.—**Morocco.**—ROAD.—For the construction of a road from the lighthouse at Tangier to the Custom House. Specification with the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C A deposit of 40*l.*

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
DIRECTOR OF GOVERNMENT BUILDING WORKS.....	Govt. of New South Wales ...	1,000*l.* per annum	Aug. 28

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BUILDERS' STOCK, PLANT, AND MACHINERY, ELTHAM—On the Premises	H. W. Smith	Aug. 29
*DEALS, BATTENS, BOARDS, TIMBER, Etc.—Great Hall, Winchester House, E.C.	Churchill & Sim	Aug. 30
*STK. OF IRONMGR & MRCHT—At Laurie Lead, etc., Co.'s Prems. Laurie Hall, Romford Mkt.	H. W. Smith	Sept. 1
*STOCK OF GAS AND WATER APPLIANCES—On the Premises	Fryett, White, & Co.	Sept.

LAW REPORTS.

BEFORE THE OFFICIAL REFEREE
(Mr. MUIR MACKENZIE).

Contractor's Action against Building Owner: Minter *v.* Waldstein.

THE hearing of this case was continued last week, it being an action brought by Mr. F. G. Minter, a builder and contractor, against Mr. Charles Waldstein, Professor of Art at Cambridge, from whom he claimed 2,750*l.*, the amount payable in respect of a certificate of Mr. Frederick Wm. Foster, an architect, and in respect of a contract made between the plaintiff and the defendant for the carrying out of alterations and additions at Newton Hall, Harston, near Cambridge. Defendant alleged that the work was defective, and counterclaimed against the plaintiff for 10,000*l.* damages.

Mr. Lewis Thomas, K.C., and Mr. G. R. Blanco White (instructed by Mr. V. Blanco White) appeared for the plaintiff; and Mr. Clavell Salter, K.C., and Mr. F. St. John Morrow (instructed by Messrs. Withers & Co.) represented the defendant.

At the conclusion of Mr. Salter's address on behalf of the defendant Mr. Lewis Thomas replied upon the whole case on behalf of the plaintiff, and in the result the learned Official Referee reserved his judgment.

Case under the London Building Act: Failure to Give Notice.

ON July 4 Mr. E. G. Rayson was summoned at the Greenwich Police Court by Mr. Baxter Greig, District Surveyor for Deptford, for failing to give notice for sundry works carried out on the premises of a florist in the Lewisham High-road. The work consisted of removing the decayed wood sill and vertical bars to the side and end of conservatory.

The defence was that the work was only necessary repair, and as such, under sect. 209 of the London Building Act, no notice was required to be given. The magistrate adjourned the case, and has now given a decision in favour of the builder, instructed by Messrs. Marchant, Newington, & Tipper, and Mr. Louis Jacob, F.S.I., A.R.I.B.A., was in court to give evidence in support of the builder, but was not required after the cross-examination of the District Surveyor. Mr. Garland Wells appeared on behalf of the District Surveyor.

PATENTS.

APPLICATIONS PUBLISHED.*

10,230 of 1910.—Abson Ercolani: Apparatus for moulding or waving wood or other material.

15,274 of 1910.—Charles Fairbank: Tenoning tool and workholder for use therewith.

17,412 of 1910.—William T. B. Masters: System of treating the exterior walls of old or new buildings to imitate stone.

18,649 of 1910.—Cecil Walton and John Beaumont Walton: Reciprocating conveyors, screens, or the like.

19,635 of 1910.—Charles McRae Grey: Rolling of flanged metal sections.

20,149 of 1910.—John Wulstan Twinberrow: Method of and apparatus for mixing the ingredients of concrete and other substances.

20,164 of 1910.—Frank Iliff: Heating and ventilating apparatus.

20,541 of 1910.—John Jesse James: Stair-rod eyes and rod brackets.

22,552 of 1910.—Thomas Benjamin Colman: Revolving doors.

25,834 of 1910.—Hermann Cohn: Processes of and devices for manufacturing concrete boards or plates as a substitute for wooden boards or planks.

27,855 of 1910.—Hermann Kaye: Hand-rammers for paving purposes.

1,732 of 1911.—Ferdinand Burchartz: Apparatus for making hollow building blocks.

4,369 of 1911.—Heinrich Christophery: Manufacture of handles for doors, windows, and the like.

10,058 of 1911.—Arthur Henry Ehlert: Sliding window-blinds.

11,306 of 1911.—Gebr. Korting Aktiengesellschaft: Apparatus for creating artificial draught in smoke stacks or chimneys.

11,716 of 1911.—John Daniel Wilcox: Door latches.

*All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 2.—By SIMMONDS & SONS.

Watlington, Oxon.—Watcombe Manor Estate, 333 a. 3 r. 8 p., f.	£7,276

August 10.—By R. GRAY & SONS.

Whitby, Yorks.—Broadings Farm, 71 a. 3 r. 23 p., f.	4,010
2 and 3, Arundel Houses, f., y.r. 53*l.*	900
1 to 5, Arundel-place, f.	1,580

August 12.—By ALFRED MANSELL & Co.

Hadnall, Salop.—Bruidway Farm, 32 a. 3 r. 2 p., f.	2,555

August 14.—By FAREBROTHER, ELLIS, & Co.

Wroughton, Wilts.—Hackpen Farm, 302 a. 1 r. 29 p., f.	3,000
Enclosure of meadow land, 26 a. 2 r. 32 p., f.	950
Two accommodation enclosures, 29 a. 3 r. 1 p., f.	1,200

August 15.—By JAMES ELEY.

Butterwick, Lincs.—Butcher's Arms b.h. and 18 a. 3 r. 20 p., f.	1,690
Freiston, Lincs.—Freehold arable land, 5 a. 3 r. 37 p.	470

August 16.—By WYATT & SON.

Eastergate, Sussex.—Myrtle-cottage, c.	340
Yapton, Sussex.—Freehold shop and house and two cottages	300

August 17.—By STIMSON & SONS.

Pimlico.—12, Rochester-row, u.t. 48½ yrs., g.r. 22*l.* 10*s.*, yr. 95*l.*	700
Stepney.—2 to 8 (even), Garden-st., and 1 to 6, Smith's-pl., f., w.r. 166*l.* 8*s.*	275
Kingsland—14 and 16, Essex-st., u.t. 57½ yrs., g.r. 14*l.* 5*s.*, w. and e.r. 135*l.* 4*s.*	320
New Malden.—Poplar-gr., freehold plot.	100

By VENTON, BULL, & COOPER.

Kentish Town.—Allcroft-rd., f.g. rents 176*l.* 1*s.*, reversion in 53 and 54 yrs.	4,270
Peckham.—Albert-rd., f.g. rents 24*l.*, reversion in 54 and 55 yrs.	545
Gordon-rd., f.g. rents 72*l.*, reversion in 57 yrs.	1,610
Norwood.—Birkbeck-rd., f.g. rents 10*l.*, reversion in 53 yrs	225
Norwood-rd., f.g. rents 30*l.*, reversion in 56 yrs.	750
St. Mary's rd., f.g. rents 22*l.* 10*s.*, reversion in 52 yrs.	455
Bermondsey.—Galleywall-rd., f.g. rents 24*l.*, reversion in 35 yrs.	620
Sutton, Surrey.—Holly-villas, f.g. rents 20*l.*, reversion in 55 yrs.	400
Plaistow.—Plaistow-rd., f.g.r. 30*l.*, reversion in 54 yrs.	630
Camberwell.—Wyndham-rd., f.g. rents 80*l.* 1*s.*, reversion in 52 yrs.	1,610
Acton.—Churchfield-rd., f.g. rents 60*l.*, reversion in 55 and 57 yrs.	1,330
Apsley-ter., f.g. rents 69*l.*, reversion in 57 yrs.	1,502
Penge.—Woodbine-gr., f.g. rents 60*l.*, reversion in 56 yrs.	1,270
Herne-hill.—Railton-rd., f.g. rents 97*l.* 10*s.*, reversion in 56 yrs.	2,800
Holloway.—Davenant-rd., f.g. rents 224*l.* 10*s.*, reversion in 47 yrs.	5,330
Hammersmith.—Richford-st., f.g. rents 78*l.* 10*s.*, reversion in 58 yrs.	1,630
Putney.—Disraeli-rd., f.g. rents 26*l.*, reversion in 55 yrs.	620
Harrow.—Roxborough-rd., f.g. rents 20*l.*, reversion in 59 yrs.	440
Tooting.—High-st., f.g. rents 35*l.*, reversion in 57 yrs.	840
Battersea.—Battersea Park-rd., f.g.r. 7*l.*, reversion in 39 yrs.	185
Stoke Newington.—Broughton-rd., f.g. rents 29*l.* 6*s.*, reversion in 53 yrs.	630
Croydon.—Cherry Orchard-rd., Surrey Arms p.h., f., y.r. 120*l.*	2,350

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

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The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

All drawings sent to or left at this office for consideration should bear the owner's name and address on either the face or back of the drawing. Delay and inconvenience may result from inattention to this.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

N.B.—Illustrations of the First Premiated Design in any important architectural competition will always be accepted for publication by the Editor, whether they have been formally asked for or not.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Per 1000 Alongside, in River.	£ s. d.
Best Stocks	1 13 0
Picked Stocks for Facings	2 7 0

Per 1000, Delivered at Railway Depôt.

	£ s. d.		£ s. d.
Flettons	1 9 0	Double Headers	13 7 6
Best Fareham Red	3 12 0	One Side and two Ends	17 7 6
Best Red Pressed Ruabon Facing	5 0 0	Two Sides and one End	18 7 6
Best Blue Pressed Staffordshire	3 15 0	Splays & Squints	15 17 6
Do. Bullnose	4 0 0	Best Dipped Salt Glzd. Str'tch'rs	10 17 6
Best Stourbridge Fire Bricks	3 14 0	Headers	10 7 6
GLAZED BRICKS.		Quoins, Bullnose, and Flats	14 7 6
Best White and Ivory Glazed Stretchers	10 17 6	D'ble Stretchers	16 7 6
Headers	10 7 6	Double Headers	13 7 6
Quoins, Bullnose, and Flats	14 7 6	One Side and two Ends	17 7 6
D'ble Stretchers	16 7 6	Two Sides and one End	18 7 6
		Splays & Squints	15 17 6

Second Quality White and Dipped Salt Glazed, £1 5*s.* per 1000 less than best.

	s. d.	
Thames and Pit Sand	6 9	per yard, delivered.
Thames Ballast	5 3	" "
Best Portland Cement	29 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12*s.* 6*d.* per yard delivered.
Stourbridge Fireclay in sacks 27*s.* 0*d.* per ton at rly dpt.	

STONE.

Per Ft. Cube.	s. d.
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1
White Basebed, delivered on road waggons Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½

Per Ft. Cube, delivered at Railway Depôt.

	s. d.		s. d.
Ancaster in blocks	1 10	Closeburn Red Freestone	2 0
Beer in blocks	1 6	Red Mansfield Freestone	2 4
Greenshill in blocks	1 10	Talacre & Gwespyr Stone	2 8
Darley Dale in blocks	2 4		
Red Corsehill in blocks	2 3		

YORK STONE—*Robin Hood Quality.*

Per Ft. Cube, Delivered at Railway Depôt.	s. d.
Scappled random blocks	2 10

Per Ft. Super., Delivered at Railway Depôt.

6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3
6 in. rubbed two sides ditto, ditto	2 6
3 in. sawn two sides slabs (random sizes)	0 11½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½
1½ in. to 2 in. ditto, ditto	0 6

STONE (*Continued*).

HARD YORK— Per Ft. Cube, Delivered at Railway Depôt.	s.	d.
Scappled random blocks	3	0
Per Ft. Super., Delivered at Railway Depôt.		
6 in. sawn two sides landing to sizes (under 40 ft. super.)	2	8
6 in. rubbed two sides ditto	3	0
3 in. sawn two sides slabs (random sizes)	1	2
3 in. self-faced random flags	0	5

SLATES.

Per 1000 of 1200 at Railway Depôt.

In. In.	£	s.	d.
20×10 best blue Bangor	13	2	6
20×12 ditto	13	17	6
20×10 1st quality ditto	13	0	0
20×12 ditto	13	15	0
16×8 ditto	7	5	0
22×10 best blue Portmadoc	12	12	6
16×8 ditto	6	12	6

In. In.	£	s.	d.
20×10 best Eur'ka unfading green	15	17	6
20×12 ditto	18	7	6
18×10 ditto	13	5	6
16×8 ditto	10	5	0
20×10 permanent green	11	12	6
18×10 ditto	9	12	6
16×8 ditto	6	12	6

TILES.

At Railway Depôt.

	s.	d.
Best plain red roofing (per 1000)	42	0
Hip and Valley (per doz.)	3	7
Best Broseley (per 1000)	50	0
Do. Ornamental (per 1000)	60	0
Hip (per doz.)	4	0
Valley (per doz.)	3	0
Best "Hartshill" brand, plain sand-faced (per 1000)	50	0
Do. pressed (per 1000)	47	6

	s.	d.
Do. Ornamental (per 1000)	52	6
Hip and Valley (per doz.)	4	0
Best Ruabon red, brown, or brindled (Edw'ds) (per 1000)	57	6
Do. Ornamental (per 1000)	50	0
Hip (per doz.)	4	0
Valley (per doz.)	3	6
Staffords. (Hanley) Reds or Brindled (per 1000)	42	6
Hand-made sand-faced (per 1000)	45	0
Hip (per doz.)	4	0
Valley (per doz.)	3	6

WOOD.

BUILDING WOOD. At per standard.	£	s.	d.		£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14	0	0	...	15	10	0
Deals: best 3 by 9	13	10	0	...	14	10	0
Battens: best 2½ in. by 7 in. and 8in., and 3 in. by 7 in. and 8 in.	11	10	0	...	12	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0		less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less thn best.			
Battens: seconds	0	10	0	"		"	
2 in. by in. and 2 in. by 6 in.	9	10	0	...	10	10	0
2 in. by 4½ in. and 2 in. by 5 in.	9	0	0	...	10	0	0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.			
½ in.	1	0	0	"			
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 5	0	0	...	5	10	0
Seconds	4	10	0	...	5	0	0
Small timber (8 in. to 10 in.)	3	17	6	...	4	0	0
Small timber (6 in. to 8 in.)	3	5	0	...	3	10	0
Swedish balks	2	12	6	...	3	0	0
Pitch-pine timber (30 ft. average)	4	10	0	...	5	5	0

JOINERS' WOOD. At per standard.	£	s.	d.		£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in.	24	10	0	...	25	10	0
3 in. by 9 in.	22	10	0	...	23	10	0
Battens, 2½ in. and 3 in. by 7 in.	17	0	0	...	18	0	0
Second yellow deals, 3in. by 11in.	19	0	0	...	20	0	0
" " 3 in. by 9 in.	18	0	0	...	19	10	0
Battens, 2½ in. and 3in. by 7 in.	14	0	0	...	15	0	0
Third yellow deals, 3 in. by 11 in. and 9 in.	14	0	0	...	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	...	12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	10	0	...	22	10	0
Do. 3 in. by 9 in.	18	10	0	...	19	10	0
Battens	14	0	0	...	15	0	0
Second yellow deals, 3 in. by 11 in.	16	10	0	...	17	10	0
Do. 3 in. by 9 in.	15	0	0	...	16	0	0
Battens	11	10	0	...	12	10	0
Third yellow deals, 3in. by 11 in.	13	10	0	...	14	10	0
Do. 3 in. by 9 in.	13	0	0	...	14	0	0
Battens	10	10	0	...	11	0	0
White Sea and Petersburg— First white deals, 3 in. by 11 in.	15	0	0	...	16	0	0
" " 3 in. by 9 in.	14	0	0	...	14	10	0
Battens	11	10	0	...	12	10	0
Second white deals, 3in. by 11in.	14	0	0	...	15	0	0
" " 3 in. by 9 in.	13	0	0	...	14	0	0
Battens	10	10	0	...	11	0	0
Pitch-pine: deals	19	0	0	...	21	0	0
Under 2 in. thick extra	0	10	0	...	1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards.			
Oddments	32	0	0	"			
Seconds, regular sizes	33	0	0	"			
Oddments	28	0	0	"			
Kauri Pine—Planks per ft. cube	0	3	6	...	0	5	0
Dantzig and Stettin Oak Logs— Large, per ft. cube	0	3	0	...	0	3	9
Small " "	0	2	6	...	0	2	6
Wainscot Oak Logs, per ft. cube	0	5	6	...	0	6	0
Dry Wainscot Oak, per ft. sup. as inch	0	0	8½	...	0	0	9½
½ in. do. do.	0	0	7	...		—	
Dry Mahogany—Houndras, Tabasco, per ft. super. as inch	0	0	10	...	0	1	1
Selected, Figury, per ft. super. as inch	0	1	6	...	0	2	6
Dry Walnut, American, per ft. super. as inch	0	0	10	...	0	1	0
Teak, per load	18	0	0	...	22	0	0
American Whitewood planks, per ft. cube	0	4	0	..	0	5	0

WOOD (*Continued*).

JOINERS' WOOD (*Continued*)— Prepared Flooring, etc.— Per square.	£	s.	d.		£	s.	d.
1 in. by 7 in. yellow, planed and shot	0	13	6	...	0	17	0
1 in. by 7 in. yellow, planed and matched	0	14	0	...	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	...	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	...	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	...	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	...	0	16	6
in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	...	0	13	6
1 in. by 7 in. " "	0	14	0	...	0	18	6
¾ in. by 7 in. white " "	0	10	0	...	0	11	0
1 in. by 7 in. " "	0	12	9	...	0	15	0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.		£	s.	d.
Rolled Steel Joists, ordinary sections	7	0	0	...	7	10	0
Compound Girders, ordinary sections	9	0	0	...	10	0	0
Steel Compound Stanchions	11	0	0	...	12	0	0
Angles, Tees, and Channels, ordinary sections	9	0	0	...	10	0	0
Flitch Plates	9	0	0	...	9	10	0
Cast Iron Columns & Stanchions, including ordinary patterns	7	10	0	...	8	10	0

METALS.

IRON— Per ton, in London.	£	s.	d.		£	s.	d.
Common Bars	8	10	0	...	9	0	0
Staffordshire Crown Bars, good merchant quality	8	15	0	...	9	5	0
Staffordshire "Marked Bars"	10	10	0	...	—		
Mild Steel Bars	8	15	0	...	9	5	0
Hoop Iron, basis price	9	5	0	...	9	10	0
" " Galvanised	17	0	0	...	—		

(*And upwards, according to size and gauge.)

Sheet Iron Black—							
Ordinary sizes to 20 g.	9	15	0	...	—		
" " 24 g.	10	15	0	...	—		
" " 26 g.	12	5	0	...	—		
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15	0	0	...	—		
Ordinary sizes to 22 g. and 24 g.	15	10	0	...	—		
" " 26 g.	16	10	0	...	—		
Sheet Iron, Galvanised, flat, best quality— Ordinary sizes to 20 g.	18	0	0	...	—		
" " 22 g. and 24 g.	18	10	0	...	—		
" " 26 g.	20	0	0	...	—		
Galvanised Corrugated Sheets— Ordinary sizes, 6ft. to 8ft. 20 g.	14	10	0	...	—		
" " 22 g. and 24 g.	14	15	0	...	—		
" " 26 g.	16	5	0	...	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	12	0	0	...	—		
Best Soft Steel Sheets, 2 g. & 24 g.	13	0	0	...	—		
" " 26 g.	15	0	0	...	—		
Cut Nails, 3 in. to 6 in.	10	10	0	...	11	0	0

(Under 3 in., usual trade extras.)

LEAD, &c.

	£	s.	d.		£	s.	d.
LEAD—Sheet, English, 4lb. and up	17	10	0	...	—		
Pipe in coils	18	0	0	...	—		
Soil pipe	21	0	0	...	—		
Compo pipe	21	0	0	...	—		
ZINC—Sheet— In casks of 10 cwt.							
Vielle Montagne	33	10	0	...	—		
Silesian	33	0	0	...	—		

Zinc, in bundles, 1s. per cwt. extra.

COPPER—							
Strong Sheet per lb.	0	1	0	...	—		
Thin " "	0	1	1	...	—		
Copper nails "	0	0	10	...	—		
Copper wire "	0	0	10	...	—		
BRASS—							
Strong Sheet "	0	0	11	...	—		
Thin "	0	1	0	...	—		
TIN—English Ingots "	0	1	11	...	—		
SOLDER—Plumbers' "	0	0	8½	...	—		
Tinmen's "	0	0	11	...	—		
Blowpipe "	0	1	2	..	—		

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

15 oz. thirds	2¼d.	26 oz. fourths	3¼d.
" fourths	1¼d.	32 oz. thirds	5d.
21 oz. thirds	3d.	" fourths	4¼d.
" fourths	2¼d.	Fluted Sheet, 15 oz.	3¼d.
26 oz. thirds	4d.	" 21 oz.	4¼d.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

¼ Hartley's	2d.	Figured Rolled, Oxford Rolled, Oceanic, Arctic, Muffed, and Rolled Cathedral, white	3¼d.
⅜ "	2¼d.	Ditto, tinted	5d.
½ "	2½d.		

Not less than three crates.

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	3	9
" " " in barrels	"	0	3	10
" " " in drums	"	0	4	0
Boiled " in barrels	"	0	4	0
" " " in drums	"	0	4	3
Turpentine in barrels	"	0	3	3
" in drums	"	0	3	5
Genuine Ground English White Lead, per ton		22	0	0
Red Lead, Dry	"	20	10	0
Best Linseed Oil Putty	per cwt.	0	11	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	6
Fine Elastic Carriage	0	12	0
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	10	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Plating Varnish	0	18	0
White Paint Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	0
Berlin Black	0	16	0
Knotting	0	10	9
French and Brush Polish	0	10	6

TERMS OF SUBSCRIPTION.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 a.m. *on Thursday*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.* unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

ABERDARE (Glam.).—For providing and fixing chemical and botanical laboratories and lecture-room fittings at the Aberdare Girls' Intermediate School, for the Glamorgan Education Committee. Mr. D. Pugh-Jones, F.S.I., County Architect, Cardiff:—

P. E. Gane, Queen-street, Cardiff*	£367	2	6

ATHY.—For erection of twenty-one working-class houses. Mr. James F. Reade, architect, 28, Barron-strand-street, Waterford:—

J. Reid	£4,422	0	
M. O'Brien	4,361	15	
D. J. Dowling	4,267	0	
Delany & Salor	£4,236	2	8
H. A. Hamilton, Waterford*	3,942	10	0

BANSTEAD.—For the erection of a motor garage at Mogador, for Mr. W. A. McVitie. Mr. Albert W. Venner, M.S.A., architect, Redhill:—

Cummins & Sons, Ltd.	£298		
J. McCluskey	268		
G. Martin	£265		
J. J. Pink, Merstham*	240		

BARMOOR.—For erection of a residence at Barmoor, near Morpeth, for Mr. R. O. Hudson. Mr. L. A. Loades, A.R.I.B.A., architect, Market-place, Morpeth. Quantities by Messrs. J. P. Allan & Partners, Newcastle-on-Tyne:—

N. Ritchie, Whitley Bay, Northumberland*	£1,490
W. M. Henderson (plumber), Morpeth*	140

CARNARVON.—For alterations, painting, etc., to the Salem Congregational Chapel, for the Building Committee. Mr. H. Glanfor Thomas, architect, Castle-buildings, Carnarvon:—

E. Jones	£900		
J. Jones & Son	887		
W. A. Roberts, Carnarvon*	869		
Jones Bros	£736		
G. T. Jones‡	325		

‡ Painting only.

CHURWELL.—For erection of new stables in William-street, for the Churwell Co-operative Society, Ltd. Mr. John Smith, architect, Leeds. Quantities by architect:—

Masons.			
W. Taylor	£90	1	8
Harrison & Pensley	93	18	0
Graythorne Bros., Adwalton, near Leeds*	83	0	0
Joiners.			
J. Burton, Churwell*	45	1	0
Harrison & Pensley	41	11	0
A. Illingworth	40	0	0
Slaters.			
J. Kellett, Morley*	10	0	0
G. Rogerson	9	5	0

CLOWN (Derbyshire).—For the construction of waterworks for the supply of the rural district, for the Rural District Council. Messrs. G. & F. W. Hodson, M.Inst.C.E., F.G.S., engineers, Loughborough:—

Pethick, Dix, & Co.	£47,340	0	0
Mowlem & Co.	43,683	0	0
T. Smart	41,381	0	0
Holme & King	39,584	3	4
G. Bell & Sons	39,548	0	0
C. Chamberlain	37,545	0	0
A. N. Coles	37,500	0	0
Airds, Ltd.	37,036	10	0
J. Riley	36,509	5	8
Ward & Tetley	35,982	8	0
C. Bushley & Sons	£35,325	5	7
W. Moss & Sons, Ltd.	35,000	0	0
Parker & Sharpe	34,241	19	0
H. Ashley, Mansfield*	33,948	16	0
Johnson Bros.	33,638	8	0
Crawford Bros.	33,600	0	0
Lane Bros.	32,518	17	6

[Engineer's estimate, £35,500.]

CONWAY.—For erection of a house. Messrs. R. Davies & Son, L.R.I.B.A., architects, Bangor :—

W. Hughes	£911 15 0	R Williams & Co.	£683 7 3
D. Roberts	816 3 6	Roberts & Owen	638 4 0
R. Roberts & Son	762 8 0	D. Jones, Son, & Roberts, Conway*	632 0 0
Evans & Pritchard	721 0 0		

DURHAM.—For alterations and additions to High Springwell House. Mr. H. T. Gradon, architect, Market-place, Durham :—

Beevers & Clark	£670 3 6	C. W. Gibson, Durham*	£577 10 0
T. Coates, jun.	599 17 6		

GILLINGHAM.—For addition of bathroom, etc., to 85, Duncan-road, Gillingham, for the Misses Watts. Mr. Ernest J. Hammond, C.E., M.S.A., of Gillingham, architect :—

H. E. Phillips	£115	A. G. Webb, Rochester*	£111
T. Cornelius & Sons	112		

GILLINGHAM.—For erection of a chapel. Mr. Ernest J. Hammond, architect, 21, Balmoral-road, Gillingham :—

Spinner	£5,657	Cornelius & Sons	£5,210
Foster	5,489	Wilford	5,200
Ballard	5,466	Seager	5,179
Tong	5,345	West Bros., Rochester‡	5,139
May	5,310	Gates & Son, Frindsbury, Rochester‡	4,937
Lewis & Son	5,290	Phillips, Gillingham‡	4,930
Ingleton & Son	5,275		
Moss & Sons	5,260		
Skinner	5,250		

‡ Retendering after slight alterations and deductions from original scheme.

GILLINGHAM.—For the making of roads and laying of sewer and surface-water drains to building estate, Mill-road, Gillingham, for Messrs. Strover, Stedman, and others. Mr. Ernest J. Hammond, C.E., M.S.A., architect and surveyor, Gillingham :—

Ingleton & Son	£1,745 0	A. Price	£1,157 8
T. Adams	1,429 10	G. W. Auger, Herne Bay*	1,020 0
J. C. Trueman	1,415 0		

GILLINGHAM.—For erection of a villa at corner of Rock-avenue and St. John's-road, Gillingham, Kent, for Miss G. Mackay. Mr. Ernest J. Hammond, C.E., M.S.A., of Gillingham, architect :—

A. G. Webb	£824	H. E. Phillips, Gillingham*	£705
T. Cornelius & Sons	733		

HITCHIN.—For Hitchin Brand-street Wesleyan Church. Messrs George Baines & Son, architects, 5, Clement's-inn, Strand, W.C. :—

J. Willmott & Sons	£437 10	M. Foster & Co.*	£406 0
F. Newton	410 0		

LEICESTER.—For new cardroom building for Mr. T. Fielding Johnson. Messrs. Tait & Herbert, architects, Leicester and Coventry :—

Wellerman Bros.	£2,622	H. Herbert & Sons.	£2,142
A. & W. Chambers	2,288	F. Elliott	2,128
Hardington & Elliott	2,268	J. Bentley & Co.	2,053

LLANFAIR (Glam.).—For the erection of a small new Council school at Llanfair, near Cowbridge, for the Glamorgan Education Committee. Mr. D. Pugh-Jones, F.S.I., M.S.A., County Architect, Cardiff :—

W. A. Jones, Barry* £1,400

LLANGAN (Glam.).—For the erection of a new Council school at Llangan, near Bridgend, for the Glamorgan Education Committee. Mr. D. Pugh-Jones, F.S.I., County Architect, Cardiff :—

Vickery Bros., Barry Dock* £2,544 15 2

MARKYATE.—For sewerage works. Messrs. Elliott & Brown, A.MM.Inst.C.E., Burton-buildings, Parliament-street, Nottingham :—

Exors. of J. Arundel	£4,711 19 0	F. Hopper	£3,700 0
J. Dickson	4,359 15 2	W. Morley & Sons	3,631 10
T. W. Pedrette	4,341 10 0	W. G. Wilmott	3,584 0
W. Muirhead & Co., Ltd.	4,190 0 0	Lane Bros.	3,569 14
D. T. Jackson	4,104 17 0	H. Williams	3,480 3
O. P. Drever	3,816 0 0	W. Thompson & Co. (G. Powdrill & Son, Ltd)	3,439 0
R. C. Crawford & Co.	3,809 7 6	H. E. Buckley	3,279 0
G. Bell & Sons, Ltd.	3,766 0 0	P. Wilson & Co., Contractor's Office, Dunstable*	3,230 0
A. H. Price & Co.	3,746 0 0		

OSWESTRY.—For erection of ten almshouses. Mr. G. W. Lacey, Borough Engineer and Surveyor, Oswestry :—

W. Felton	£1,598 0 0	Jones & Evans	£1,406 13 9
T. Huxley	1,550 0 0	J. C. Vaughan, Oswestry*	1,398 0 0
J. Higgins	1,500 0 0	W. Griffiths & Son	1,350 0 0
W. H. Thomas & Sons, Ltd.	1,475 0 0		
W. Roe	1,448 10 6		

[Borough Surveyor's estimate, £1,513.]

PORTSMOUTH.—For erection of a public convenience. Mr. P. Murch, Borough Engineer and Surveyor :—

F. V. Leuton	£460 0	Woods & Co., 78, St. Vincent-st., Southsea*	£380 0
E. Till	421 8		
J. Crockerell	421 0		

POSSILPARK.—For erection of a library, for the Corporation of the City of Glasgow. Mr. G. Simpson, architect, 233, St. Vincent-street, Glasgow. Quantities by Messrs. Shearer & Marr, 219, St. Vincent-street, Glasgow :—

Mason: F. Rodger, Maxwell-road*	£1,853 9 1	
Wrights: J. Baxter & Sons, 20, Catherine-street*	1,857 17 0	
Plumber: J. L. Arnot, 204, Bath-street*	417 18 0	
Plasterers: G. & R. Wemyss, 39, Victoria-road*	206 7 11½	
Steel: Fleming Bros., 65, Bath-street*	459 4 7	
Concrete: Hamilton & Co., 7, Surrey-street*	534 4 8	
Slaters: Hamilton & Co., 7, Surrey-street*	52 0 0	
Glaziers: G. & J. Rae, 21, Ingram-street*	282 15 1	
Tiles: Keem & Wardrop, 167, Bath-street*	320 13 3	

[All of Glasgow. Since plans were adopted a basement has been allowed for.]

WALTHAMSTOW.—For painting, etc., at the Technical Institute, for Essex Education Committee. Mr. F. Whitmore, County Architect, Chelmsford :—

E. Fuller & Son	£310 0 0	J. Penn	£246 0 0
D. W. Lucas	295 0 0	J. Sands	237 10 0
E. G. Rogers	284 17 0	G. M. Page, Walthamstow*	202 10 0
A. G. Barton	262 0 0		

WELLS.—For additions and alterations at the boys' school. Mr. A. J. Pictor, architect, Bruton, Somerset :—

Broad & Sons	£2,850	H. Pittard & Son	£1,988
Sheppard	2,318	Ford & Son	1,950
W. Webb	2,298	C. Bryer & Junr.	1,850
F. S. Webb	2,263	A. Poole	1,840
Chancellor & Sons	2,120	T. Stockham, Bridgwater*	1,685
J. E. Fursland	2,100		
D. R. Dunthorn	2,098		

WHITEHAVEN.—For erection of a ferro-concrete bridge over the River Ehen, for the Whitehaven Rural District Council. Mr. George Boyd, Engineer, 33, Queen-street, Whitehaven :—

C. Walton, Moresby, Whitehaven* £350

WITHYCOMBE (Devon).—For erection of four houses at Withycombe, for Mr. W. Sage, of Withycombe. Mr. G. Beavis, architect, 4, Johnson's-place, Exmouth :—

H. J. Gay Lang	£799 0 0	H. Greenaway	£705 17 6
R. B. Ponsford	788 10 0	W. Densham, Victoria-road*	600 0 0
F. Greenaway & Son	730 0 0		

[All of Exmouth.]

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